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REPORT

OF THE

COMMISSIONER OF THE INTERIOR FOR PORTO RICO

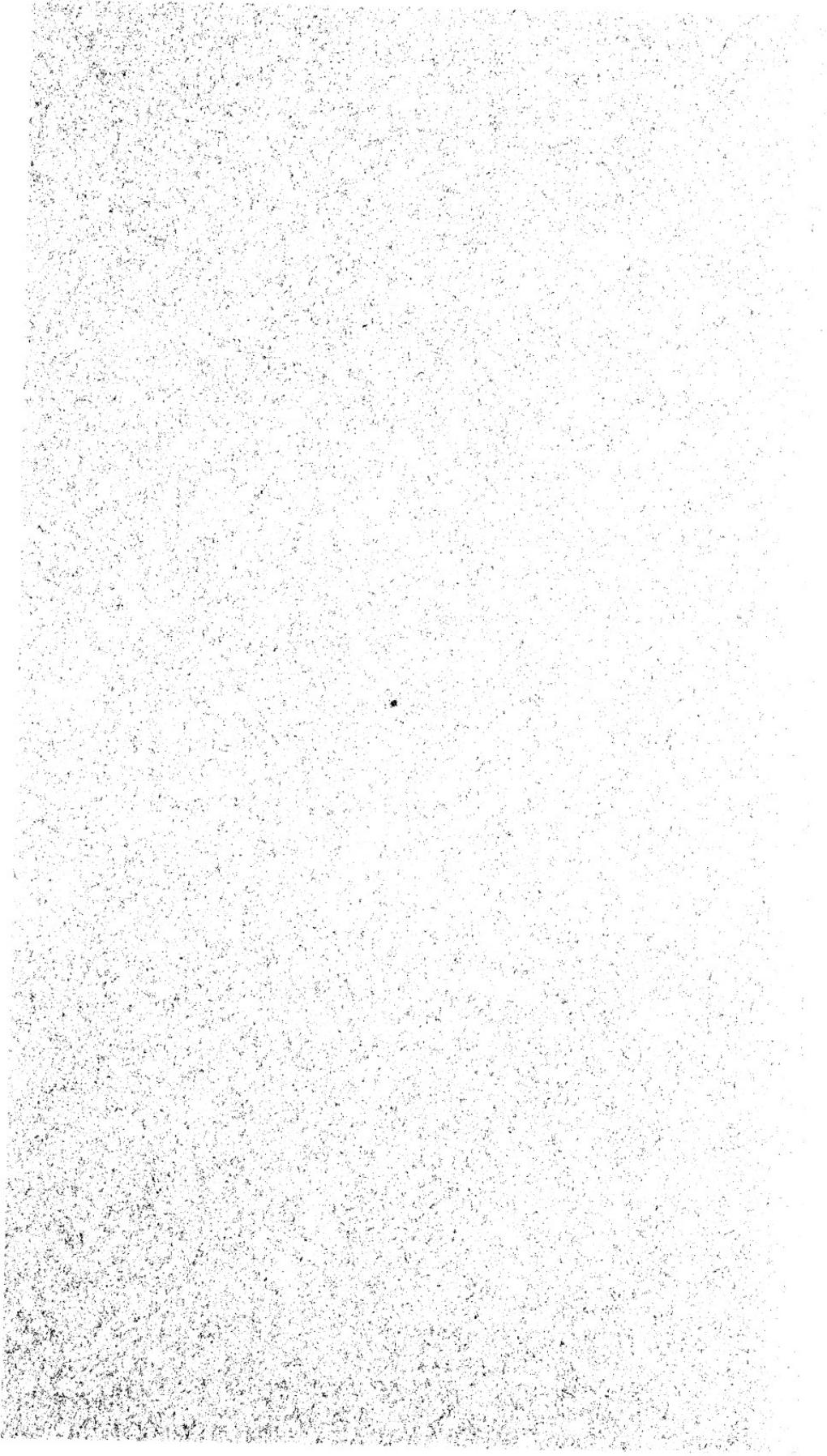
TO THE

SECRETARY OF THE INTERIOR, U. S. A.

1904.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.

1904.



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DEPARTMENT OF THE INTERIOR,
Washington, June 24, 1904.

SIR: I have the honor to invite your attention to section 24 of the act of Congress approved April 12, 1900 (31 Stat., 77), entitled "An act temporarily to provide revenue and a civil government for Porto Rico, and for other purposes," which provides as follows:

That the commissioner of the interior shall superintend all works of a public nature, and shall have charge of all public buildings, grounds, and lands, except those belonging to the United States, and shall execute such requirements as may be imposed by law with respect thereto, and shall perform such other duties as may be prescribed by law, and make such reports through the governor to the Secretary of the Interior of the United States as he may require, which shall annually be transmitted to Congress.

I have to request that you will cause this matter to be brought to the attention of the commissioner of the interior, with request that he will prepare and forward through you for my consideration, at a date not later than October 1, 1904, a report of the matters pertaining to Porto Rico with which he is charged under existing laws. It is also desirable that he embody in his report a detailed statement brought down to date of the character, quantity, and location of Crown lands, the ownership of which the United States succeeded to by virtue of the treaty of Paris, together with a statement of the quantity and location of all unclaimed or swamp lands in Porto Rico. This report should cover the period from July 1, 1903, to the date of its rendition. In this connection it is suggested that statistical statements embodied in the report should not be given from estimates where it is possible to obtain the same from original sources.

It is deemed proper to add that in the interest of economy it is desirable that the report should be as brief as circumstances will permit and that all unimportant exhibits be omitted, as well as photographs not intended to show the condition and industrial progress of the Territory.

The manuscript of the report should, as far as practicable, be type-written, free from interlineations, properly paged, and provided with a table of contents. All exhibits should be suitably marked and referred to by such marks wherever mention is made of them in the body of the report.

It is desirable that the report of the commissioner of the interior of Porto Rico be submitted to the Department within the time above specified, in order that proper consideration may be given to the important subjects therein requiring attention in the annual report of the Secretary of the Interior to the President.

Very respectfully,

E. A. HITCHCOCK, *Secretary.*

The GOVERNOR OF PORTO RICO,
San Juan, P. R.



REPORT
OF THE
COMMISSIONER OF THE INTERIOR FOR
PORTO RICO.

EXECUTIVE MANSION, PORTO RICO,
San Juan, July 30, 1904.

SIR: I have the honor to forward herewith the fifth annual report of the operations of the department of the interior of Porto Rico, as requested in your letter of June 24, 1904, to the governor of Porto Rico.

Respectfully,

BEEKMAN WINTHROP,
Governor.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

DEPARTMENT OF THE INTERIOR OF PORTO RICO,
OFFICE OF THE COMMISSIONER,
San Juan, July 29, 1904.

SIR: I have the honor to acknowledge receipt by reference from the governor of Porto Rico of your letter of date June 24, 1904, inviting his attention to the requirements of section 24 of the act of Congress approved April 12, 1900, and requesting him to cause the matter to be brought to the attention of the commissioner of the interior for compliance by him with the requirements of the law. In response thereto I respectfully submit my fifth annual report as commissioner of the interior for Porto Rico.

DEPARTMENTAL ORGANIZATION.

The department of the interior has remained organized as stated in my last report, with the exception that on April 1, 1904, the bureau of health was, pursuant to an act of the last session of the legislative assembly, transferred to the administrative control of the director of health, charities, and corrections, a newly created office. At the same session the bureau of agriculture was abolished, to take effect July 1, 1904, and a division of disbursements and accounts was created in the department of the interior, doing away with the position of a disbursing officer in each bureau, as heretofore required.

PUBLIC LANDS AND BUILDINGS.

The only public lands and buildings now belonging to the Federal Government are such as were reserved by the several proclamations of the President for the use of the Army, Navy, and other public purposes, and over which the insular government has no control. Portions of the lands described in some of the proclamations, particularly those reserved for the Navy, are insular, but it has been understood and agreed from the beginning that these parcels would be transferred to the Federal Government, and the governor was so authorized by legislative enactment. But points of difference arose relative to the correct interpretation of the description of a tract of 80 acres on San Juan Island and extending to the bay. The matter was submitted to the attorney-general of Porto Rico, and his opinion, with the papers and maps in the case, was laid before the Attorney-General of the United States, who has recently rendered his decision, necessitating a new survey and readjustment of the lines of the tract, which survey is now being made by representatives of this department and the Navy. It is expected that the report will be satisfactory to all parties concerned and that the whole matter will come to a speedy conclusion.

The work of the bureau of public lands, limited to the facilities afforded by a very small appropriation, has been confined to the inspection and classification of the most important tracts of land belonging to the people of Porto Rico and to the investigation of titles to property claimed by individuals. The labor performed and the results obtained have been important in the establishment of a basis for future surveys, for which it is to be hoped the legislative assembly will make early and ample provision, for the need is great as an assurance of good title and inducement to possible investors in real estate, many of whom have refrained from buying through fear of loss or expensive lawsuits. The report of the chief of the bureau of public lands (Exhibit A) presents in detail an account of the operations of his office during the year.

PUBLIC WORKS.

The good work of road building has been pushed steadily forward during the past year, and the results, to one with knowledge of the conditions as they were when American occupation of Porto Rico began and has been intimately connected with the development of the system to date, are highly gratifying. The slogan of my previous reports has been the need of roads as the first requisite to the prosperity of the island, the convenience, comfort, happiness, and contentment of the people; and now that the efforts of the four years devoted to road construction, involving the expenditure of quite \$2,000,000 generously provided by Congress, are bearing abundant fruit in rural development, easier, quicker, and cheaper transportation, my ardor and enthusiasm have in no manner cooled or abated. That which I at one time claimed as the first and best thing to do for the benefit of the people I am glad to refer to, although it is not yet wholly accomplished, as the greatest benefit enjoyed by them under any government, and as the day of my departure from Porto Rico draws near the uppermost desire of my heart is that my successor may be imbued with the same strong conviction and be provided somehow with the means to carry the work on to final completion.

The trust fund, being the refund of customs revenue collected on importations from Porto Rico into the United States prior to the establishment of civil government and appropriated by Congress for the benefit of the people of Porto Rico, amounting finally to about \$2,400,000, has been drawn upon from time to time, chiefly for construction and repair of roads and bridges and for building schoolhouses, until there remains an available balance of only about \$225,000. It is the opinion of the governor and heads of departments, through whom allotments are made, that it would be wise to husband a portion of these means as an emergency fund. Should this policy prevail the further construction of insular roads must end with the expenditure of the present allotments, the balances of which, on July 1, aggregated about \$120,000, for the insular revenues, under present levies, would not warrant a larger appropriation for roads than that now provided for maintenance—about \$230,000.

The idea of a loan for public improvements has been favorably discussed, indeed a loan bill has been presented at each succeeding session of the legislative assembly since the inauguration of civil government and has regularly passed the house of delegates, but while it was in name a bill to provide for public improvements its purpose and provisions were to obtain money for agricultural loans, with the hope to thereby relieve the depressed interests and particularly to revive the coffee industry.

The majority of the council members deemed it unnecessary to make a loan for public improvements so long as the trust-fund balance admitted of the construction of roads, bridges, and schoolhouses as rapidly as the facilities at hand would permit, and they could not agree that the policy of borrowing money by the government to be loaned to individuals was either wise or safe, particularly as it was susceptible of easy demonstration that the people, who really needed financial assistance would be least likely to receive it. Hence the measure was regularly voted down in the council.

At the last session of the legislative assembly a bill creating a commission to negotiate a loan of not less than \$3,000,000 nor more than \$5,000,000 passed both houses and was approved by the governor. The commission performed its duty and made report to the governor, who called the legislative assembly in extraordinary session to further consider the matter. It immediately developed that the house was bent on diverting the proceeds into agricultural loans pure and simple, leaving, except by merest reference, the public-improvement feature out of sight. At one time it did seem that a majority of the council members were about to agree to the house measure, but wiser counsel prevailed and the bill was defeated.

It is quite probable that a loan bill will be introduced in the next assembly, but unless the elections result in the choice of delegates of a different frame of mind, there is small ground to hope that provision for carrying on road construction, which must end within the next six months from exhaustion of trust-fund allotments, will be made, certainly not by an increase of the rate of taxation on lands and improvements, for, while the present rate is only 1 per cent for all purposes, insular and municipal, the landowners affect to be oppressed to the verge of bankruptcy. Of course, this distress arises from the fact that whereas the burden of taxation formerly rested upon the poor, who paid toll on what they ate and wore, almost for the air they

breathed, now the rich are compelled to contribute according to their holdings.

It was proposed, and the proposition would have been accepted, to increase slightly the excise tax on certain articles, particularly rum, cigars, and cigarettes to provide for the sinking fund and interest on the loan. This provision would not have been a burden upon any person or class, yet would have yielded a revenue of about \$300,000 a year. If the legislative assembly would impose this increase and reserve the proceeds as a special fund for public improvements, the good work could be carried on, and in a few years the whole system of insular roads and bridges would be completed.

Meanwhile, the "country road" law, as time advances and the supervisors are gaining in knowledge and experience, is producing more satisfactory results. By this law the island is divided into seven districts coextensive with the election, or political, districts. Each district has three road supervisors, who have charge of the rural and vicinal roads and trails, and the boards are under the general control of the commissioner of the interior, to whom they must submit for approval their projects and estimates for road repair and improvement. As a revenue, the insular treasurer is required to pay over to the treasurer of each board of road supervisors 8 per cent of the municipal taxes collected in the district. This fund amounts to about \$50,000 a year, and while it is not large it is nevertheless sufficient for a considerable amount of road repair and maintenance. Meantime, this department, from trust-fund allotments, has constructed or put in good condition for traffic a number of the most important rural roads in the several districts, so that the supervisors have only the expense of maintaining them, which they can easily do.

As a further help to the road districts and certainly a very reasonable and just proposition, it is proposed to enact a law providing for the imposition of a poll tax on every able-bodied male over the age of 21 years, the tax to be the moderate sum of \$1, or two days' labor on the roads, as its equivalent. Such a law would enable the supervisors to carry trail improvement quickly into districts at present almost inaccessible, for provision would be made to prevent calling the men to work too far away from their homes.

The very able and complete report of the acting superintendent of public works, submitted herewith (Exhibit B), together with the reports of his subordinates in charge of the several branches of the bureau, shows clearly the condition of affairs in that all important division of the public service, and presents in detail the story of progress made in the material development of the island's most valuable interests. If every prospective reader of this report could know Porto Rico and be able to appreciate by a study of the accompanying map just what the many lengths of road constructed or repaired and pointing toward the interior mean to thousands of poor farmers and laborers, the magnitude and value of the work done and underway would be vastly more impressive than mere words can accomplish. There were under insular maintenance on July 1, 573 kilometers of completed roads, 305 of which have been constructed since October 18, 1898. In addition to the above the government has built and turned over to the district supervisors, 42.75 kilometers of vicinal road. Prior to January 1, 1905, there will be completed, not included in the above, of insular roads 111.8 kilometers, of vicinal roads 14 kilo-

meters, which will make a grand total of 473.55 kilometers of road constructed during the six years of American occupation as against 268 kilometers during the four hundred years of Spanish control.

The completion of the road from Arecibo to Ponce, 85 kilometers in length, is worthy of special mention. Construction was begun by the Spanish authorities many years ago. At the date of American occupation they had built about 20.5 kilometers. The military authorities promptly took up the work, and the insular government has vigorously pursued it. On July 1 the last section was finished, and the highway is open to traffic. This road shortens the travel time between San Juan and Ponce at least three hours. It is of first-class construction throughout, and presents a panorama of the most magnificent scenery, rivaling the views of any of the famed roads of Europe. As its attractions become known it will undoubtedly grow in favor with tourists, who will find it more attractive and beautiful than the popular so-called military road.

The retirement of Mr. Adam Stierle in February from the position of superintendent of public works was a regrettable incident. Mr. Stierle's attainments as a civil engineer, his long experience on works of magnitude and importance, and his fine executive ability combined to fit him for the place, and but for the fact that the assistant superintendent, Mr. Pedro F. Fernandez, appointed to succeed him, happened to possess many of the same good qualities and is thoroughly familiar with the details of the work and duties of the office, the resignation of Mr. Stierle, offered that he might accept a more desirable place, could hardly have been considered at the time.

BUREAU OF INSULAR TELEGRAPH.

The report of the superintendent of insular telegraph covers fully and interestingly the development and operations of the system during the past year. It will be noted that the lines have reached out, several stations have been added, and the business, both in volume and receipts, has grown. This branch of the service is fortunate in having had as superintendent, from the date of its organization, a person who is not only an expert in the theory and practice of telegraphy and possessed of admirable executive ability, but has likewise faith in and the knack to utilize native ability. In the beginning the serious problem to be solved in connection with the establishment of the telegraph system seemed to be the probable inability to interest native young men and boys to the extent of inducing them to study and practice the art. The idea of establishing a school for young ladies was the outgrowth of apprehension that young men and boys would not respond to the inducements offered. The school evidently proved an incentive to both sexes, with the result that operators, male and female, and good ones, are sufficiently plentiful for the requirements of the service.

The last legislature made fairly liberal provision for the extension of the system, but not sufficient to cover all of the lines projected in the plans of the bureau. The very best possible use will, however, be made of the means at command, in hopes that the remaining gaps will appeal so strongly to the good judgment of the members of the assembly as to induce them to make an appropriation next year large enough to complete the system.

AGRICULTURE AND MINES.

The report of the chief of the bureau of agriculture and mines (Exhibit D) contains full information relative to the agricultural interests of the island. As hereinbefore stated, this bureau was abolished by act of the last legislative assembly. No one seems able to offer a sufficient explanation of the action. That there was need for economy in the construction of the budget was a plain enough proposition, but that a bureau so useful to the agricultural interests, the basic structure of all prosperity to the island, and requiring only small provision, should be abolished does not seem reasonable or wise.

The bulletins issued by the bureau contained carefully selected matter of practical value; the growing demand for the bulletins and increasing correspondence elicited by the contents proved their value to the farmers. It is to be hoped that the next legislature will recognize the justice of providing for the continued publication of these useful pamphlets.

ARCHIVES AND RECORDS.

As shown by the report (Exhibit E) of the chief of the division of archives, the many valuable records of the several departments have been properly classified, indexed, and filed. It is now an easy matter for interested parties to trace quickly and accurately the history of any subject of public concern.

CONCLUDING REMARKS.

In concluding this, my last annual report, for it is not my purpose to continue longer than a few months more in the insular service, I can but repeat, in substance, the tribute I endeavored to pay in my report for 1902-3 to the loyalty, efficiency, and integrity of the employees of the department of the interior. Nearly all of them are natives, but in their grasp of duties under changed conditions, their devotion and quickness of comprehension, they have proved themselves fully competent and wholly reliable, entitling them to the respect, regard, and confidence of the head of the department, which feelings I shall ever entertain for them, one and all.

Very respectfully,

W. H. ELLIOTT,
Commissioner of the Interior for Porto Rico.

Hon. ETHAN ALLEN HITCHCOCK,
Secretary of the Interior, Washington, D. C.
(Through the Governor of Porto Rico.)

EXHIBITS.

EXHIBIT A.

REPORT OF THE ACTING CHIEF OF THE BUREAU OF PUBLIC LANDS.

DEPARTMENT OF THE INTERIOR OF PORTO RICO,
BUREAU OF PUBLIC LANDS,
San Juan, P. R., July 1, 1904.

SIR: In accordance with the contents of your communication of the 16th ultimo, I have the honor to submit to you statements of the work accomplished by this office from its installation, July 1, 1903, to July 1, 1904, as follows:

First. Statement of the work of inspection, investigation, and classification of the lands belonging to the people of Porto Rico, in the jurisdictions of Manati, Arecibo, Vega Baja, Yauco, Guayanilla, and part of Utuado, coupled also with an investigation of many private properties, on suspicion that the whole or part were public property.

Second. Statement of the regular office work transacted during the period from July 1, 1903, to June 1, 1904.

Third. Statement of deeds filed in the bureau, during the same period, of lots of lands acquired by the people of Porto Rico for the purpose of schools, a jail, and the institute of vaccination.

This office has also been busy entering in the register book of the people of Porto Rico 74 properties, including in this number all those acquired for the purpose of schools, a jail, etc.

A careful inspection of the "expedientes" on file in the bureau is also being effected, and out of the 7,490 on file, so far 1,121 have been separated and recorded in a special inventory for later transference to the division of archives, as they are not of further use in the bureau.

Finally I deem it my duty to mention that the inspector of public lands continues in Utuado to carry onward the completion of the work of inspection, investigation, and classification in that jurisdiction.

Very respectfully,

JOSÉ SUAREZ,
Acting Chief Bureau Public Lands.

Hon. W. H. ELLIOTT,

Commissioner of the Interior, San Juan, P. R.

APPENDIX 1.

Statement of the work of inspection, investigation, and classification of lands belonging to the people of Porto Rico in the jurisdictions of Manati, Arecibo, Vega Baja, Yauco, Guayanilla, and part of Utuado, coupled with an investigation of private properties on suspicion of encroachment.

MANATI-ARECIBO.

Caño de Tiburones, situated between the jurisdictions of Manati and Arecibo, west of the town of Barceloneta, with the result of acquiring a knowledge of the quality of the land, provable extension of the same, considered in about 6,500 cuerdas, and the valuation of \$6 per cuerda for the best quality and \$4 for the lowest.

The investigation of 106 private properties surrounding the said caño, the examination of the deeds, and the verification of the same at the office of the register of the

property in Arecibo, thus bringing about the exposure of the individuals suspected of squatting on the land.

Of 16 cuerdas in barrio Bajura, jurisdiction of Manati, its valuation at \$3.50 each, being of inferior quality and little fit for cultivation. They were listed in the bureau.

A portion of 25 cuerdas in the same barrio and jurisdiction, of about the same quality as the above; valuation, \$3 per cuerda. Listed in the bureau.

A portion of 100 cuerdas, situated in barrio Rio Arriba, of the jurisdiction of Manati, of bad quality on account of its high elevation; valuation, only \$2 per cuerda. Listed in the bureau.

A portion of 50 cuerdas, same locality. Valuation being second class (\$2.50), they were not in the lists of the bureau.

Three portions of 200, 100, and 100 cuerdas, situated in the barrios of Garrochales and Palmas Altas, of the jurisdiction of Manati, which appeared in the lists as property of the people of Porto Rico. After investigation they turn out to be private property and have to be eliminated from the lists.

Two portions of 200 and 100 cuerdas in barrio Hato Viejo, in the jurisdiction of Arecibo, have been eliminated from the lists, as they prove to be private properties.

A portion of 259 cuerdas in barrio Rio Arriba, same jurisdiction as the above, under cultivation and in possession of a squatter, who has valued the lot himself at \$1,295. There was not any record in the bureau of this lot, but now it has been listed as the property of the people of Porto Rico.

Investigation of eleven more private properties in barrios Islote and Sabana Hoyos, jurisdiction of Arecibo, all showing private properties.

In barrios Rio Arriba, Florida, Garrochales, and Palmas Altas the investigation of eleven more properties, on suspicion of being public lands, resulted as above.

VEGA BAJA.

Two portions of 100 and 200 cuerdas, barrios of Pugnado Adentro and Pugnado Afuera, divided into plain land in the center and hilly and sandy ground in the remainder. The character of the subsoil does not permit of the retention of moisture, which interferes with vegetation. They have not been listed at the bureau, pending; as they are, in a suit with the treasury department.

A portion of 100 cuerdas in barrio Pugnado Afuera, known by the name of "Saban de las Milicias." The condition of the land is identical with the last two mentioned portions. It appears listed in the bureau with an extension of 200 cuerdas. From the investigation the names of the individuals squatting in the three portions of land are known.

Investigation of 16 private properties contiguous to the mentioned three portions.

YAUCO GUAYANILLA.

A large tract comprising 5,000 cuerdas, which extends through the barrios Boca, Barinas, Susua, and Guanica in the place named "Hato Criollo." Different portions of this tract take the names of Cobanas, Mariel, Hoya Honda, Ballena, Vega Bonita, Picuas, and Carenero, in the jurisdiction of Yauco. About one-fifth only of the whole quantity of cuerdas is considered of good quality, and the estimate is \$8 per cuerda. The soil of this portion of the land is sandy, mixed with vegetable detritus, the valuation for the remainder, fully four-fifths, being only \$2. This large tract was listed in the bureau and from the investigation the names of the many squatters have been ascertained for further action.

A portion of 71.60 cuerdas situated in the port of Guanica, in the jurisdiction of Yauco, almost naked of all sort of vegetation except for some grass and mangroves. The valuation of this piece of land depends on the use it would be given on account of being near the port.

Another portion of 72.50 cuerdas in Guanica, in the place called "Limon," same jurisdiction, was listed in the bureau, but it results from the investigation that it is legally owned by the actual occupant and has to be eliminated from the lists.

A portion of 100 cuerdas in barrios Susua and Almacigo, in the place called "Querbrada Fria," same jurisdiction. The ground is hilly and of little vegetative strength; even briars do not prosper there. Valuation per cuerda, \$1. It was listed in the bureau.

Three portions of land of 600, 300, and 150 cuerdas each, known as "Las Peladas," extending through barrios Collores, Almacigo, Ranchones, and Frailes. The ground is of very poor quality, being full of loose stones, and on this account the valuation can not go higher than \$1.50 for the first lot and \$1 for the other two. They were listed in the bureau, but the extension is unknown.

Another portion of 27 cuerdas in barrio Rio Prieto, same jurisdiction. It is situated within other private properties. The land is broken and the valuation is \$8 per cuerda. Some one has squatted there, and before listing the lot in the bureau the rights of the party in possession have to be investigated.

A large portion of 1,139 cuerdas of the name of "Sierra Guilarde," in barrio De Pasto, in the old jurisdiction of Guayanilla. Clayish soil of a white and yellow hue, which retains the water from the rains, forming deep hollows, interfering with transit of man and beast and does not favor vegetation. Such poor conditions make the estimate per cuerda of \$1 appear exaggerated. This portion of land was already listed in the bureau.

In barrio Pasto, in the same jurisdiction, is another lot of 200 cuerdas, with conditions equal to the latter in every feature. They were also listed in the bureau.

One hundred and seventy-five cuerdas of mangrove land, situated in the port of Guayanilla. The value of this lot depends on the market quotation for the product the day that a sale or a lease of the land is decided upon. It was already listed in the bureau.

In the place named "Cerro Criollo," barrio Boca, of the jurisdiction of Guayanilla, there is a tract of 800 cuerdas of hilly ground, not of great elevation, full of loose stones and in the declines of the hills sandy and clayish, with the rest of old forests. As the land is not watered in any sort of way, living in the place is not possible, and the raising of cattle out of the question. On this account the estimate per cuerda can not go higher than \$4 for one-fourth of the extension and \$2 for the remainder. They were already listed in the bureau.

The investigation of 23 private properties in the jurisdictions of Yauco and Guayanilla proved that all of the owners were legally in possession of their respective holdings.

UTUADO.

Investigation and inspection on account of suspicion of being the whole or in part the property of the people of Porto Rico of 15 private properties and the deeds corresponding to the same in barrios Santa Rosa, Caguana, Angeles, Arenas, and Tetuan resulted in showing that the owners were legally in possession of the land.

Same of 41 private properties in barrios Angeles, Vivi Abajo, Vivi Arriba, Norzagaray, Jueca, Paso Palma, Caonillas y Jayuya, the result of the investigation and inspection being still pending of the examination of the deeds in the register of property at Arecibo.

JOSÉ SUAREZ,
Acting Chief Bureau of Public Lands.

APPENDIX 2.

Statement of the regular office business transacted in the bureau of public lands since its installation, July 1, 1903, to June 30, 1904.

[Formation of the lists of the lands known to belong to the people of Porto Rico, as a help and guide to the field work of the inspector of public lands.]

	To June 1, 1904.	To June 30, 1904.	Total.
Information required by the several departments, duly furnished	52	5	57
Information solicited by private parties and supplied	22	11	33
Directions and instructions to the inspector of public lands	12	.....	12
Requirements of documents on file by the various departments.....	14	3	17
Copies provided to private parties of documents on file and certification of the same, for which \$16.70 have been collected in revenue stamps.....	4	.....	4

JOSÉ SUAREZ,
Chief Bureau of Public Lands.

SAN JUAN, P. R., June 30, 1904.

APPENDIX 3.

Statements of deeds registered and filed in the bureau of public lands acquired by the people of Porto Rico since July 1, 1903, to June 30, 1904, for the purpose of schools, jail, vaccine institute, courts, etc.:

According to the statement delivered June 1, 1904, 15 deeds, representing 112,873.92 square meters were registered and filed. Filed and registered to date, 1 lot and house in Arecibo, for the use of the district court, 1 deed, representing 455.82 square meters. Grand total, 113,329.74 square meters.

JOSÉ SUAREZ,
Chief Bureau of Public Lands.

SAN JUAN, P. R., June 30, 1904.

EXHIBIT B.

REPORT OF THE ACTING SUPERINTENDENT OF PUBLIC WORKS.

DEPARTMENT OF THE INTERIOR OF PORTO RICO,
BUREAU OF PUBLIC WORKS,
San Juan, P. R., June 30, 1904.

SIR: In accordance with directions contained in your letter of May 16, 1904, I have the honor to submit the following report of the work done under the bureau of public works during the fiscal year from July 1, 1903, to July 1, 1904.

The construction of roads and bridges and their maintenance after completion is the principal work under this bureau, and during this fiscal year, out of a budget of \$326,920, the sum of \$244,420 has been appropriated for such work. The balance of \$82,500 was appropriated as follows:

Maintenance and repairs of public buildings	\$35,000
Expenses at the Executive mansion	12,500
Construction of jails at Ponce and Arecibo and purchase and repair of building for the district court at Arecibo	35,000

From "trust-fund" allotments, amounting to \$244,500, there was authorized and made available this year for road repair and construction of roads as follows:

Mayaguez-Cabo Rojo road (less \$9,996.52 expended previous to July 1, 1903)	\$12,000.00
San German-Lajas road	5,000.00
Caguas to San Lorenzo	15,000.00
Aibonito-Barranquitas road (allotted March 21, 1904)	15,000.00
Mayaguez to Consumo	15,000.00
Las Marias road (construction)	30,000.00
Arroyo-Patillas road	10,000.00
Lares to San Sebastian	15,000.00
Aguadilla to Camuy	20,000.00
Fajardo to Naguabo	12,000.00
Ponce to Guayama	20,000.00
Consumo to Maricao	13,000.00
Manati River bridge (from previous allotments, \$8,000), total	18,000.00
Mameyes to Fajardo (allotted February 1, 1904)	10,000.00
Sabana Grande to San German	10,000.00
Manati to Ciales (Morovis branch)	8,000.00
Rio Piedras to Trujillo Alto	8,000.00
San German to Pezuela bridge	6,500.00
Yauco to Sabana Grande	6,000.00
Yabucoa to Maunabo	4,000.00

And the expenditures to date are as follows:

Mayaguez to Cabo Rojo	\$12,500.00
San German to Lajas	4,252.69
Caguas to San Lorenzo	15,000.00
Aibonito to Barranquitas	14,924.01
Mayaguez to Consumo	13,026.84
Las Marias road	2,864.76
Arroyo to Patillas	1,201.85
Lares to San Sebastian	26,028.42

Aguadilla to Camuy	\$36,198.55
Fajardo to Naguabo	22,640.88
Ponce to Guayama	31,541.71
Consumo to Maricao	1,452.30
Manati River bridge	(a)
Mameyes to Fajardo	32,500.56
Sabana Grande to San German	1,418.31
Manati to Ciales (Morovis branch)	(a)
Rio Piedras to Trujillo Alto	2,026.27
San German to Pezuela bridge	10,090.61
Yauco to Sabana Grande	67,253.30
Yabucoa to Maunabo	2,467.93

Total 297,388.09

With these allotments and expenditures, 56.10 kilometers of new roads have been completed, 19.4 kilometers of old roads efficiently repaired, and 40 kilometers are in course of repair.

The "trust fund" has been more particularly assigned to the repairs of old roads, some of which will later be considered as insular roads and maintained as such from the regular budget, but are not yet entirely constructed in accordance with the specifications for the completed first-class insular roads; the object has been to improve such old roads and put them in fair condition for travel and the transportation of agricultural products and to some extent at the same time to afford relief to the unemployed. The detailed statements of the disbursements on account of budget and "trust fund" are given under Appendix A, with the report of the disbursing officer for the fiscal year 1903-4.

As stated in previous reports, over 250 kilometers of first-class roads were constructed under the Spanish Government by the "Jefatura de Obras Publicas," of which the bureau of public works may be considered the American successor.

In order to demonstrate how this road work has progressed since the year 1858, the time of the creation of a technical personnel of public works in Porto Rico, a diagram is attached to this report showing at a glance the road work accomplished in the preceding years up to 1898 by the Spanish Government and from the year 1898 to date by the American Government. The inclination of the line shows the rate of progress, which was by the Spaniards for the period of thirty-nine years an average of $6\frac{3}{4}$ kilometers per year, and for the Americans for a period of six years $46\frac{1}{2}$ kilometers per year, the highest rate for the Spaniards for any period of six years having been 13 kilometers, from 1881 to 1886.

The following table, prepared in connection with this diagram, describes the lines followed and lengths of road constructed:

Roads constructed under the Spanish and American Governments.

	Spanish Govern- ment.	American Govern- ment.	Total.
	Kilometers.	Kilometers.	Kilometers.
San Juan to Ponce Playa	135.00	.....	135.00
Ponce to Arecibo (through Adjuntas and Utuado)	20.50	60.50	81.00
Cayey to Arroyo (through Guayama)	26.00	7.00	33.00
Rio Piedras to Mameyes (through Carolina and Rio Grande)	31.50	.70	32.20
Between Mameyes and Naguabo Playa (crossing Luquillo, Fajardo, and Ceiba) .....	.....	21.50	21.50
Catano to Reyes Catolicos bridge (through Bayamon)	19.00	.....	19.00
Reyes Catolicos bridge to Corozal (through Toa Alta)	4.50	11.50	16.00
Reyes Catolicos bridge toward Vega Alta	4.00	3.70	7.70
Aguadilla to San Sebastian	5.00	18.00	23.00
San Sebastian toward Lares .....	.....	10.40	10.40
Mayaguez toward Anasco	9.00	.....	9.00
Mayaguez toward Las Marias .....	.....	16.50	16.50
Mayaguez to San German	13.50	1.00	14.50
Between San German and Sabana Grande .....	.....	1.50	1.50
Between Sabana Grande and Yauco .....	.....	14.60	14.60
Caguas to Humacao Playa .....	.....	39.00	39.00
Manati to Ciales .....	.....	12.80	12.80
Between Morovis and junction road Manati to Ciales .....	.....	5.00	5.00
Between Bayamon and Comerio .....	.....	18.30	18.30
Between Yabucoa and Maunabo .....	.....	6.50	6.50
Between Camuy and Aguadilla .....	.....	32.50	32.50
Total	268.00	281.00	549.00

a No expenditure.

Besides, under the American Government extensive improvements almost amounting to reconstruction have been made in the following roads:

	Kilometers,
Between Ponce and Guayama.....	24.00
Between Caguas and San Lorenzo	8.00
Barranquitas toward Aibonito.....	8.40
Cidra to Las Cruces.....	8.00
Cabo Rojo to junction road Mayaguez to San German.....	5.75
Caguas to Aguas Buenas.....	9.00
Naguabo to Naguabo Playa.....	2.00
Lajas toward San German.....	2.00
Between Consumo and Maricao	1.00
Between Rio Piedras and Trujillo Alto	1.00
Total	68.75

The engineers of the Spanish Government had to develop the road work under an approved plan of the so-called State roads, which comprised the following routes:

Road No. 1.—From San Juan to Ponce Playa, passing through Rio Piedras, Caguas, Cayey, Aibonito, Coamo, Juana Diaz, and Ponce.

Road No. 2.—From Catano to Mayaguez, passing through Bayamon, Vega Alta, Vega Baja, Manati, Arecibo, Hatillo, Camuy, Quebradillas, Isabela, Aguadilla, Aguada, Rincon, Anasco, and Mayaguez.

Road No. 3.—From Mayaguez to Guayama, passing through Hormigueros, San German, Sabana Grande, Yauco, Guayanilla, Ponce, Santa Isabel, Salinas, and Guayama.

Road No. 4.—From Cayey to Guayama.

Road No. 5.—From Caguas to Humacao Playa, passing through Gurabo, Juncos, Piedras, Humacao, and Humacao Playa.

In charge of the insular corporation called "diputacion provincial" there were the following lines:

Road No. 6.—From Arecibo to Ponce, through Utuado, Adjuntas, and Ponce.

Road No. 7.—From Rio Piedras to Fajardo, passing through Carolina, Rio Grande, Mameyes, Luquillo, and Fajardo.

Road No. 8.—From Aguadilla to Lares, passing through Moca, San Sebastian, and Lares.

Road No. 9.—From Bayamon to Comerio.

None of these roads was completed when the Americans took possession of the island, with the exception of road No. 1, in which, however, several important bridges were and are still needed. These roads and others shown in the map accompanying this report, numbered from 1 to 14, form the general plan of the present insular roads already built and in maintenance, or to be completed as the appropriations from the regular budget or from the "trust fund" will permit.

At present the condition of these roads is shown in the following list:

List of insular roads.

No.	Designation.	Total length.	Uncom-	
			pleted length.	Kilometers.
1	San Juan to Ponce Playa.....	135.00	135.00	.....
2	Catano to Mayaguez.....	164.00	68.20	95.80
3	Mayaguez to Guayama	130.00	30.60	99.40
4	Cayey to Arroyo	35.00	33.00	.....
5	Caguas to Humacao Playa.....	39.00	39.00	.....
6	Ponce to Arecibo.....	81.00	81.00	.....
7	Rio Piedras to Arroyo.....	137.00	60.00	77.00
8	Lares to Aguadilla.....	39.50	33.40	6.10
9	Bayamon to join road No. 1	49.00	18.30	30.70
10	Road No. 2, Barros.....	58.00	16.00	42.00
11	Manati to Juana Diaz.....	61.00	17.80	43.20
12	Coamo to Barros.....	17.00	.....	17.00
13	Mayaguez to Arecibo.....	61.00	16.50	44.50
14	Aibonito to road No. 13	96.00	.....	96.00

The personnel and duties of the bureau have remained the same as last year. We only have to regret the retirement of the able superintendent of public works, Mr. A. Stierle, who so masterfully and assiduously conducted the business under his care.

For the other employees I have only to repeat the commendation of the superintendent. They all direct their endeavors in the measure of their capabilities to secure an honest and successful administration of the share of the public trust confided to them.

List of employees of the bureau of public works.

Name, title, etc.	Fund.	Salary.	Duties.
A. Stierle, civil engineer, superintendent.	Regular budget.	\$3,000	General direction of all the operations of the bureau. Chairman of the board of award.
P. F. Fernandez, civil engineer, assistant superintendent.	.....do	2,400	To assist the superintendent in his labor and substitute him during temporary absence or vacancy. Especially in charge of franchises, concessions, examination of plans, and specifications in connection therewith. Examination and report on projects for municipal works on the public domain by private parties. Matters relating to road work under the district road law and prison labor, etc. Member of the board of award.
J. J. Jimenez, civil engineer, general inspector.	Trust fund.....	2,000	General inspection of road and bridge works when directed by the superintendent; preparation of new plans and specifications especially for roads carried out with money from the "trust fund."
F. Spinoza, clerk and typewriter.	Regular budget.	1,200	
F. Fano, clerk, translator, and typewriter.	.....do	1,200	
DIVISION OF MAINTENANCE.			
F. Montilla, district engineer, San Juan.	Regular budget.	1,800	In charge of maintenance of the roads in the district of San Juan and matters in connection therewith. Investigation and report on matters connected with the department of public works in his district.
Chas. G. Borch, clerk and typewriter.	Trust fund.....	1,000	
J. C. Besosa, district engineer, Ponce.	Regular budget.	1,800	In charge of maintenance of the roads in the district of Ponce and matters in connection therewith. Investigation and report on matters connected with the bureau of public works in his district.
Matos Bernier, clerk and typewriter.	.....do	720	
R. Skerrett, district engineer, Mayaguez.	.....do	1,800	In charge of maintenance of the roads in the district of Mayaguez and matters in connection therewith. Investigation and report on matters connected with the bureau of public works in his district.
J. Blanco, clerk and typewriter.	.....do	720	
G. Boyce, supervisor of public buildings.	.....do	1,500	In charge of repairs of all insular buildings for the departments and for district courts in San Juan and other towns. Repairs of the executive mansion.
F. Delgado, clerk and typewriter.	.....do	900	
A. Morales, surveyor of public lands and architect of buildings.	.....do	1,500	Survey of public buildings and adjacent grounds within the city of San Juan and other towns; platting and staking out and establishment of bench marks for the metes and bounds of said property; description and filing of records, etc.
DIVISION OF VOUCHERS AND ACCOUNTS.			
Ed. H. Jones, chief clerk.	Regular budget.	1,800	Minute examination of vouchers, pay rolls, and accounts pertaining to all the offices and field operations. Keeping account of all appropriations, etc.
S. Truxton, special clerk.	Trust fund.....	1,800	Examination of engineer estimates and documents, especially in connection with the "trust fund" allotments.
J. M. Canals, voucher clerk and typewriter.	Regular budget.	1,080	Clerical work.
J. W. Blanco.	Trust fund.....	1,080	Do.
N. Carbia, voucher clerk and typewriter.	Regular budget.	900	Do.

List of employees of the bureau of public works—Continued.

Name, title, etc.	Fund.	Salary.	Duties.
DIVISION OF DISBURSEMENTS.			
W. C. Smith, disbursing officer.	Regular budget.	\$2,000	Requisitions of funds, payments of all vouchers pertaining to public works, issuance of money checks, keeping account of all disbursements. Payment of pay rolls in cash twice a month to laborers, etc.
W. O. Johnson, clerk and bookkeeper.	do	1,200	
F. Peniman, pay-roll clerk.	Trust fund.	1,200	
A. Contreras, check clerk.	Regular budget.	1,000	
DIVISION OF DRAFTING.			
J. F. Callejo, draftsman	Regular budget.	1,200	Superintendent of drafting division. In charge of cement testing in the laboratory, etc.
E. Guillen, draftsman	do	720	
A. Brioso, draftsman	do	720	
R. Margenat, draftsman	Trust fund.	720	
F. Tallada, copyist	Regular budget.	300	
A. Moscioni, photographer	Trust fund.	900	
DIVISION OF PROPERTY.			
H. Simonet, property clerk	Regular budget.	900	Care of property, inventories, and property returns.
Pio Amador, storekeeper	do	720	
<i>Watchmen.</i>			
Rivera		360	
Cintron		360	
<i>Messengers.</i>			
H. Rodriguez		300	
A. Smith		300	
<i>Janitors.</i>			
R. Margary		300	
Cifredo		300	

BOARD OF AWARD.

A. Stierle, superintendent of public works. Retired February, 1904.

J. B. Rodriguez, assistant commissioner of the interior.

P. F. Fernandez, assistant superintendent of public works. Acting chairman since December, 1903.

Now, to relate the annual work done, which is the special object of this report, I shall consider the matter under the following headings:

- I.—Construction of roads and bridges.
- II.—Repairs of old roads.
- III.—Construction of roads with convict labor.
- IV.—Surveys for new roads and bridge sites, etc.
- V.—Maintenance of insular roads.
- VI.—Public buildings and lands.
- VII.—Franchises and permits for occupation of the public domain; examination of plans in connection therewith. Examination of plans for municipal and other works.
- VIII.—Miscellaneous.

I.—CONSTRUCTION OF ROADS AND BRIDGES.

1. *Rio Chico section of the Arecibo-Ponce road.*—The construction of this portion of road was carried out under a contract with Marix & Co. dated February 28, 1903, and completed in April, 1904. The term of obligatory maintenance being six months, ran into the present fiscal year, and the final settlement was made on December 16, 1903. The total amount paid the contractor was \$92,879.13. The original allotment was \$79,000 from the "trust fund." The difference, \$13,879.13, was taken from the allotment of \$85,000 made April 27, 1903, from the "trust fund" for the Arecibo-Ponce road, Tallones section. There was paid for supervision, field and office force, and land damages \$9,726.44, which makes the total cost of the completion of the 5.22 kilometers of road \$79,000, or at the rate of \$15,134 per kilometer.

This portion of road is now under care of the Ponce division of maintenance.

2. Tabucoa-Maunabo road.—This section, of 9.36 kilometers, was to be completed January, 1903, under contract with Demetrio Garofalo, dated April, 1902, against an allotment of \$38,000 from the "trust fund." For good reasons, several extensions of time for the completion of the contract were given the contractor, and the contract was finally closed in June, 1903; for, although the road was not completed, the contractor had done more work than the original amounts called for in the contract.

The final settlement was made October 3, 1903, and the contractor was paid \$31,283.41. The road was to be continued by day labor under the direction of the local engineer. The conditions of the ground over which this road is located are such that the amount of work previously estimated was greatly exceeded, by the necessity of filling deep hollows unexpectedly exposed after the sliding of big boulders peculiar to the Pandura Mountain, and removing these slides, which have been a source of trouble and expense in the construction of this road.

The balance of the allotment proved insufficient to complete the road, and another allotment of \$4,000 from the "trust fund" was made January 27, 1904, which will be all expended this year. The completed portion of this road is under maintenance in charge of the San Juan division.

3. San Sebastian-Lares road.—The contract for the construction of the 14.67 kilometers of road between San Sebastian and Lares was awarded to Marix & Co. on May 6, 1902. The work was to be completed in twelve months, expiring June 1, 1903. However, on account of incidents related at length in last year's report of this bureau, this contract was closed before completion and the contractors paid on December 22, 1903, for final settlement, \$23,605.57, the total amount earned and paid them being \$63,416.62 for about 10 kilometers of finished road.

On January 29, 1904, another allotment, amounting to \$16,000, from the "trust fund" was made to complete this road, and work has been in progress by day labor since April last, in charge of an experienced sobrestante and under the direction and inspection of this bureau. The progress of the work is very satisfactory, about 2 kilometers having already been completed.

4. Bayamon-Comerio road.—A section of road 14.5 kilometers long on the Bayamon-Comerio road, beginning at Bayamon, was let by contract to Messrs. Mullenhoff & Korber, approved January 17, 1903. The work was to be completed in one year and paid from an allotment of \$120,000 from the "trust fund." Owing to prolonged fine weather and intelligent management by the contractors, the whole work was completed and provisionally accepted in January, 1904, and after the term of four months of maintenance the final acceptance took place on April 5, 1904, and it is now under regular maintenance of the San Juan division. The final liquidation and settlement of all moneys earned by the contractors and expenditures for inspection, supervision, etc., show a total amount of \$119,997.43 for the 14.5 kilometers, or at the rate of \$8,275.68 per kilometer.

5. Tallones-Adjuntas section of the Arecibo-Ponce road.—This section, 4 to 6 kilometers, when completed, will close the gap in the finished road from Arecibo to Ponce. An allotment of \$85,000 was authorized from the "trust fund" April 29, 1903, for the completion of this piece of road and for 32 culverts to be constructed along a stretch of about 9 kilometers of that section from Utuado.

After due advertising, bids were opened July 16, 1903, with the following results:

Jose Roig Colomer, Utuado	\$60,626
Raoul Marix, San Juan	47,577
Domingo Rinatti, Ponce	69,370
Luis F. Rubio, San Juan	65,629
Roque Paniagua, San Juan	71,307
W. D. Noble, San Juan	71,518

The contract was awarded to Raoul Marix, the lowest bidder, the work to be completed in five months. On account of unusually heavy rains, the work could not be completed at the end of the five months, expiring December 28, 1903, and the contractor has been granted three extensions of time. The provisional acceptance finally took effect June 25, 1904. The road is now under obligatory maintenance by the contractor during four months, as specified in the contract, and opened to traffic.

Some extra work has been done under proper authority, and the total amount earned by the contractor to June 30, 1904, was \$48,856.61.

6. Las Marias road.—Under an allotment of \$30,000, authorized March 21, 1903, from the "trust fund," the survey of about 4 kilometers on the Las Marias road was begun.

Three different locations had been surveyed, and the one considered most advantageous selected for the final construction. The project was completed, and after its

approval by the commissioner of the interior bids were called for by advertisement and opened June 20, 1904, with the following results:

Adriano Gonzalez, Mayaguez	\$15,569.50
L. Ninliatt, Mayaguez	14,892.00
Jose C. Gonzalez, Mayaguez	14,510.50
Victor Honore, Mayaguez	13,224.00
Roque Paniagua, San Juan	14,673.00

The contract was awarded to Victor Honore, of Mayaguez, the work to be completed in five months.

7. *Reconstruction of culverts on the Caguas-Humacao road.*—The work of reconstructing some culverts on this road was related in the preceding annual report. The work was let by contract with the lowest bidder, D. M. Palmieri, of Adjuntas. Operations began in June, 1902, and work was completed September 5, for the amount of \$6,373.55, as bid.

BRIDGES.

Manati River bridge.—Construction on this bridge began early in 1900 by the military engineers. It is located on the Manati-Ciales road, crossing the Manati River about 9 kilometers from Manati, at a site called "Mata de Platanos." The natural rock on the Manati side will form one of the abutments; the other abutment, on the Ciales side, has been constructed of concrete. The span is 80 meters, and the steel and iron superstructure purchased during Spanish times for the Loiza River bridge, near Carolina, as already related in previous report, is to be finally erected over these abutments. For reasons also previously related, the construction of a central masonry pier to divide the span in two was approved, and said construction began by contract, after proper advertisement, with the lowest bidder, F. H. Janes, who failed to accomplish his contract, and, moreover, sued the administration for alleged damages due him, with the result that this work, which was to be completed in April, 1903, was only finished in November, 1903, by the bondsmen of the failing contractor, and the final payment of the 10 per cent retained is still pending.

With a balance of a trust-fund allotment made in 1901 amounting to about \$8,000, and the new allotment of \$10,000 from the "trust fund" made February, 1904, it has been made possible to proceed to carry out the contemplated erection of the bridge. Plans and documents were prepared for the purpose, and after approval by the commissioner of the interior, and due advertising, the following bids were received and opened May 20, 1904:

Dooley, Smith & Co	\$24,498
Roque Paniagua, San Juan	15,749
Axtmayer & Son, San Juan	28,750
L. Ninliatt, Mayaguez	12,770
Luis F. Rubio, San Juan	18,171
A. Nin Martinez, San Juan	15,949

Mr. L. Ninliatt, being the lowest bidder and known to the bureau as an able contractor, the awarding of the contract to him was recommended to the commissioner of the interior. The contract was entered into June 1, 1904, duly approved by the commissioner of the interior June 2, 1904, and work began at once.

2. *Mavilla River bridge.*—The work of finishing the spandrel walls and the parapets of this bridge, after due advertising, was let by contract to the lowest bidder, Roque Paniagua, for the sum of \$2,838, on August 15, 1903. The work was to be completed November 15, 1903, but on account of unusually heavy rains the contractor requested and was granted an extension of one month. The work was completed and the contract closed within the extension. The contractor earned \$3,028.02, due to an excess in the quantities of masonry over the estimates.

3. *Submergible bridge across the Portugues River.*—This type of temporary bridge has been designed as an experiment to carry the roadway across the river with a relatively inexpensive construction.

The structure is a low pile bridge, submergible by the higher floods; hence its designation. It is expected that if properly constructed this type of bridge will receive little damage from the floods and will be easily repaired, thus allowing the postponement for better times of the final construction of the high and costly bridge which will allow the crossing of the river in all conditions of the floods.

The construction of the Portugues submergible bridge was begun last year under contract awarded to Carlos Clausells for the sum of \$2,260. The allotment from the "trust fund" was \$4,250 and allowed the construction of the approaches on both sides. The bridge was opened to the public traffic in September, 1903, and so far has proved efficient.

4. Submergible bridge across the Anasco River.—The allotment of \$8,500 from the "trust fund" for the construction of this bridge was made December, 1902. During the second half of the last fiscal year the survey and plans for the structure were made, and after due approval by the commissioner of the interior the work was advertised, with the result that a contract was entered into with Louis Ninliatt, of Mayaguez, August 4, 1903, to build the bridge in accordance with the specifications for the sum of \$4,620. The work had to be completed November 4, 1903, but the contractor was granted an extension of time for reasons that were considered sufficient, and the work was only finished March 11, 1904.

A high flood of the Anasco River occurred March 11, causing the washout of two timber bridges of private property above the site of our bridge, and the timber of said bridges and other considerable amount of drift carried by the floods against the structure caused loosening of some piles by extensive scouring of the bed of the river. The damage inflicted showed at once the necessity for driving longer piles and otherwise strengthening the bridge to enable it to resist any similar occurrences. Such repairs required additional work, which was carried out by the contractor under a supplementary agreement in accordance with the provisions of the original contract. The bridge is now completed and was opened to public traffic May 16, 1904.

5. Repairs to Guayo River bridge.—This is one of the two concrete and steel bridges built by contract with Mr. Edwin Thacher. The construction started under the military government of the island in 1900 and was completed under the civil government in February, 1901. The bridge is on the highway between Ponce and San Juan, across the Guayo River, at about 26 kilometers from Juana Diaz. Some time after the bridge was opened to public traffic cracks made their appearance, especially on the arch on the Ponce side of the bridge.

The largest cracks were visible between the crown of the arch and the spandrel wall; they seemed to increase with time and so alarmed the district engineer at Ponce that he recommended the taking down of the arches and their substitution by iron spans. However, after proper investigation it was ascertained that there had been absolutely no movement of the abutments, and consequently no immediate danger was apprehended of the collapsing of the structure. It was believed at headquarters that the difference in concrete used for the arches and the spandrel walls, and the fact that these walls were built before the arches had been loaded with the earth filling and macadam, were sufficient cause of unequal settlements and contractions in the arches and spandrel walls, producing the objectionable cracks, but that the strength of the arches was not thereby impaired. As it was, however, publicly rumored that the bridge was not safe, it was decided to make a new test of the west span (Ponce side) with dead load, and if possible with live load, to remove all doubt about the safety of the structure. The test was carried out in November, 1903, with very satisfactory results. The arch was loaded on the center with 52,825 pounds, or at the rate of 160 pounds to the square foot, and the total deflection was 0.015 foot, which promptly disappeared after removal of the load.

The live-load test consisted in making twenty men run across the span three abreast on the north side near the reading gauge. This load caused only an oscillation of 0.001 foot.

The repairs proposed consist in the proper drainage of the filling and in the obliteration of all cracks by proper plastering and grouting.

II.—REPAIRS OF OLD ROADS.

1. Mayaguez-Consumo road.—This is the first section, 15 kilometers long, of the Mayaguez-Las Marias road, comprised between Mayaguez and a place called "Consumo," which is the starting point of 8 kilometers of new road built toward Las Marias by the military government in 1901.

In March, 1903, the governor authorized an allotment of \$15,000 from the "trust fund" for the repairs of this section of road, and work began with the construction of 15 concrete drainpipes needed and repair of old ones. This work was carried out by contract with Victor Honore. Bids were opened September 28, 1903, for the construction of 15 concrete drainpipes and repair of 6 culverts and 6 old drainpipes along the Mayaguez-Consumo road, as follows:

Raoul Marix, San Juan (three months)	\$4,085.00
Benjamin Morales, Corozal (two months)	2,850.00
A. Salas, Mayaguez (three months)	3,963.00
Roque Paniagua, San Juan (three months)	3,352.00
Duffaut & Gonzalez, Mayaguez (two months)	2,776.15
Victor Honore, Mayaguez (three months)	2,432.50

Under his contract Honore completed the work in December, 1903, earning only \$1,919, on account of actual quantities resulting less than estimated; the balance of the total allotment was expended in repair of the roadbed by day labor, and is now nearly exhausted. This section will be under regular maintenance next fiscal year.

2. *Yauco-Sabana Grande road.*—This section has a total length of 17 kilometers, of which 12 were completed last year. An allotment from the "trust fund" of \$6,000 was authorized February 1, 1904, to repair the remainder, and work began February, 1904, under an experienced sobrestante, and the allotment was exhausted in May without completing the repairs. About 1 kilometer remains unfinished. From July 1 it will be maintained by the regular force under appropriations in the regular budget.

3. *Maneves-Fajardo road.*—The length of this section is 18 kilometers, of which 8 kilometers have been thoroughly repaired from previous allotments of the "trust fund." For the remainder an allotment of \$10,000 was authorized February 1 of this year; work began February 20, and 4 kilometers have been thoroughly reconstructed, with an expenditure of \$9,600.

4. *Fajardo-Naguabo Playa road.*—The total length of this section is 20 kilometers, of which 11 have been repaired from previous allotments of the "trust fund." For the 9 kilometers untouched an allotment of \$12,000 from the trust fund was authorized February 1, 1904. Work began February 5, 1904, and 4.5 kilometers were reconstructed by the end of June.

5. *Camuy-Aguadilla road.*—The total length of this section is 42 kilometers, of which 27 kilometers were repaired from various allotments during the years 1901 and 1902. Work of improvement under the present allotment of \$20,000 from the "trust fund" began in March last and is progressing rapidly, 8 kilometers having been already thoroughly reconstructed with an expenditure of \$14,000.

6. *Ponce-Guayama road.*—The total length of this road is 56 kilometers as follows:

	Kilometers.
Ponce to Santa Isabel	23
Santa Isabel to Salinas	12
Salinas to Aguirre	11
Aguirre to Guayama	10

The repairs on this road began in December, 1902, against an allotment of \$30,000 from the "trust fund," and about 20 kilometers were repaired as follows:

	Kilometers.
Between Ponce and Santa Isabel	8½
Between Santa Isabel and Salinas	3
Between Salinas and Aguirre	2
Between Aguirre and Guayama	2

Under the new allotment of \$20,000 from the "trust fund," authorized February 1, 1904, the work was resumed at two different points between Salinas and Aguirre, and it is in good progress. The sum of \$5,000 has already been expended.

7. *Mayaguez-Cabo Rojo road.*—The greater part of the work on this section, 6 kilometers long, was done last fiscal year and was completed during the first month of the present fiscal year, when it was turned over to the road supervisors of the Mayaguez district for maintenance as a vicinal road.

8. *San German-Lajas road.*—The sum of \$5,000 was allotted from the "trust fund" to repair this vicinal road, especially to improve the steep rocky grade near San German. Work began July 16, 1903, and after the allotment was exhausted the road was recommitted to the care of the road supervisors of the Mayaguez district.

9. *Vega Alta road.*—Work began on the repair of this road, 8 kilometers long, of which 4 kilometers were completed before 1898, as part of the insular road No. 2, in July, 1903, from an allotment of \$5,000 authorized June 2, 1903. The main work was the regulating of the rocky grade called "Cuesta de Guerra" by some and "Espinosa" by others. The allotment was exhausted October, 1903, leaving the road in good condition. It is now in charge of the San Juan district of maintenance.

10. *Caguas-San Lorenzo road.*—On this section of road, 9 kilometers in length, up to the year 1898 about \$12,000 were expended by the Spaniards in the uncompleted construction of about 3 kilometers, including several masonry culverts. Under the American military government \$8,418 more were expended, and although the road was greatly improved much remained to be done in order to avoid three fords of the five existing across the Loiza River. The other two could also be avoided by locating the road on the south bank of the river, but that improvement would cost over \$15,000 for little more than 1 kilometer of road, and for reasons of economy it was considered best for the present to keep the two crossings nearer Caguas and use the available funds in repairing the rest of the road. March 21, 1903, an allotment

of \$15,000 was made from the "trust fund;" work was organized August 11, 1903, and the allotment exhausted January 31, 1904, leaving the road in fair condition. It is now in charge of the road supervisors of the district of Guayama.

11. *Manati-Ciales road (Motoris branch).*—This branch is 12 kilometers long, on which about \$56,000 have been expended since the military government to date, with the result that nearly all the grading has been done and about 8 kilometers of completed road are under regular maintenance. A new allotment of \$8,000 was made February 1, 1904, and work of improvement has been resumed.

12. *Arroyo-Patillas road.*—An allotment of \$10,000 from the "trust fund" was made May 21, 1903, for repair of the road, which is 7 kilometers long. Last year a survey was made of a cut-off beginning at kilometer 4, from Arroyo, to shorten the distance between Arroyo and Maunabo about 3 kilometers. This has been finally located and is in course of construction by the interested parties.

The allotment will be expended on the repairs needed between Arroyo and Patillas. The work of improvement was begun June 22 under a competent sobrestante.

13. *Aibonito-Barranquitas road.*—This is a vicinal road, which was completely surveyed in 1901. The length of the road from Barranquitas to a point on the central main road No. 1 near Aibonito is 11 kilometers, the construction of which was estimated to cost \$33,500.

The improvement of this trail was begun under the military government by Captain Wheeler, U. S. Army, and \$7,721 had already been expended in its general improvement when the new allotment of \$15,000 from the "trust fund" was made March 21, 1903.

The work under that allotment began October 15, 1903, and the allotment was exhausted April 11, 1904, leaving a good macadamized road over 9 kilometers, with culverts and pipes. About \$10,000 are still needed to complete the portion of over 3 kilometers already surveyed, but untouched, to the junction with the main road near Aibonito.

14. *Consumo-Maricao road.*—This is a vicinal road 10 kilometers long, and branches from the 15-kilometer of the Mayaguez-Las Marias road. It is in very bad condition, and an allotment of \$13,000 from the "trust fund" was authorized in February, 1904, for its repair. Work was organized April 25, 1904, and already 4 kilometers of roadbed and ditches have been repaired, put in good shape, and ready for macadam. The stone in hand is not of the best, but nevertheless makes a good metaling for the light traffic on the road.

15. *Sabana Grande-San German road.*—Work was organized to repair this road, 8.2 kilometers, long under an allotment of \$10,000 from the "trust fund," authorized last February. Work began April 15, and is progressing well; 4 kilometers will be repaired by July 1, 1904, with an expenditure of about \$5,000.

16. *San German-Pezuela bridge.*—This section, 6 kilometers long, is a part of insular road No. 3, not yet constructed under the specifications for main roads; its location is low, and during rainy weather it gets in very bad condition. The allotment of \$6,500 from the "trust fund," made last February, for the improvement of this road will repair it fairly. Work was started last April with the regular force of maintenance and some auxiliary help under the direction of the district engineer at Mayaguez.

17. *Rio Piedras-Trujillo Alto.*—The length of this road is 7 kilometers. Along its location the best stone quarries on the island for building and road construction are to be found. The road branches off at kilometer 3 of insular road No. 7, between Rio Piedras and Carolina, and the stone supplied by these fine quarries will be then easily available for the public works. An allotment of \$8,000 from the "trust fund" has been authorized for the improvement of this road. Work began on March 10, 1904, and is progressing well; about 2 kilometers have been completed and 2½ kilometers more are graded. The stone for the metaling is furnished by agreement after competition with the owners of quarries, and is delivered broken and ready to be used on the road.

III.—ROAD WORK BY CONVICT LABOR.

After due advertising for bids for the construction of the buildings to be erected at the convict camp on the road from Humacao to Yabucoa, to be opened July 2, 1903, only one bid was submitted, that by Juan R. Lois, of Humacao, for the amount of \$2,200. This bid, besides being informal, exceeded the estimate of the bureau and was rejected by the board of award. The bureau was then authorized to proceed by day labor, and work was started in August, 1903, under a native sobrestante of experience.

The buildings were completed and the camp fenced at a cost of \$1,800. Everything being ready to receive the prisoners, October 13, 1903, the proper requisition

was made by the commissioner of the interior to the director of prisons, through the attorney-general, as called for by the regulations, for the transportation of 120 prisoners to the camp at Humacao, to begin work on the road as soon as possible.

The prisoners arrived at the camp November 6 and were immediately employed in quarrying stone for the road. A force of 50 policemen was detailed to guard the prisoners in the camps and during work in the road. The work of quarrying stone progressed at a slow rate from the start until March 31, 1904, when the prisoners were conveyed back to the penitentiary by order of the governor. On account of the legislature failing to appropriate funds for the maintenance of the police guarding the convicts it was imperative to discharge the force at that date.

The buildings for the camp on the Jayuya road were built on the site selected near the "Alto de la Bandera" on road No. 6, section Adjuntas to Ponce. Work began September 20, 1903, and the camp was fenced and ready to receive the prisoners by the end of November, at a cost of \$1,900.

The requisition, under the regulations, was recommended to the commissioner of the interior by the superintendent of public works in order to send 120 prisoners to Adjuntas to begin work on that road. The requisition was made, but did not materialize on account of the publicly expressed opinion that free labor was being prejudiced by the work of the convicts on the roads, and, perhaps for other economical reasons, the governor was not in favor of the continuance of the convict work for road building, and in his last message to the legislature recommended the repeal of the law under which the convict road work was being carried out. The legislature, however, did not repeal the law, but failed to appropriate funds for the police guard, and work was forcibly suspended for that reason, as before stated.

The work performed by convict labor at Humacao is as follows:

Stone quarried from November 6 to March 31, 1904, 2,129.45 cubic meters; broken stone, 35 cubic meters. Repair and grading of 650 meters of road.

No convict work was done at Jayuya.

Each camp is now in charge of a care taker and further legislative action is awaited.

IV.—SURVEYS FOR NEW ROADS AND BRIDGE SITES.

The only survey made during the year for new roads was for the location of 4 kilometers of the Las Marias end of the Mayaguez-Las Marias road, the project for the construction of which was completed, duly approved, and, after advertising, the work was let by contract with Victor Honore, as related under heading I of this report.

Another survey was made for the project of reconstruction of a street along the water front of the harbor of San Juan, which work was completed by contract June 10.

V.—MAINTENANCE.

The organization for the maintenance of the completed insular roads is the same as in the preceding fiscal year. The island is divided into three districts of maintenance, with headquarters at San Juan, Ponce, and Mayaguez, each in charge of a district engineer.

The number of kilometers of road under maintenance last year was 445.1. This year it amounts to 518.2, an increase of 73.1 kilometers.

The district of San Juan has 275.3; Ponce, 161, and Mayaguez, 81.90 kilometers.

The district engineer of San Juan has under his orders 10 sobrestantes, 20 capataces, and 91 camineros, and has employed during the year 216 auxiliary laborers, supposing 300 working days in the year and 45 cents wages.

With 275.3 kilometers under maintenance, the average is: For each sobrestante, 27.5; each capataz, 13.8; each caminero, 3, and each auxiliary, 1.274 kilometers.

The district of Ponce has for the 161 kilometers under maintenance 7 sobrestantes, 10 capataces, 57 camineros, and has employed during the year 116 auxiliary laborers, an average of, for each sobrestante, 23; each capataz, 16.10; each caminero, 2.824, and auxiliary laborers, 1.387 kilometers.

The Mayaguez district has employed 3 sobrestantes, 6 capataces, 22 camineros, and 36 auxiliary laborers, an average of, for each sobrestante, 27.3; each capataz, 13.6; each caminero, 3.7, and auxiliary laborers, 2.3 kilometers.

The average cost per kilometer has been: In the district of San Juan, \$391.26; district of Ponce, \$369.61; district of Mayaguez, \$368.12.

The difference is explained not only by the average price obtained in each district for the stone, but especially by the amount of stone used, which items have been:

	Average price.	Quantity used.
	<i>Cubic meters.</i>	
San Juan district.....	\$1.714	18,430
Ponce district.....	1.558	10,090
Mayaguez district.....	1.807	3,800

In the annual report for the preceding fiscal year the superintendent of public works wrote at length on the complex question of maintenance, quoting from various sources the cost per kilometer per year for maintaining the macadamized roads in a number of foreign countries, and showed that the cost per kilometer in Porto Rico was much the highest. "In explanation," the superintendent stated, "for the high cost in Porto Rico, it should be said that a great portion of our work done under the title of maintenance is really new construction, required in completing unfinished and neglected sections of road and in rebuilding broken bridges and culverts and other auxiliary works which were destroyed by the cyclone of 1899."

From the records in this bureau we can ascertain that the average for maintenance of all roads under the Spanish Government for the year 1887-88 was \$416.16 per kilometer, and as high as \$982.79 per kilometer per year for the section between San Juan and Rio Piedras; the general average is higher than the average obtaining this year, viz, \$376.33 per kilometer for all roads under maintenance.

For various reasons the purchasing value of the dollar at present for road labor and material is about the same as that of the "peso" in former times, and the figures have been compared without any reduction.

Our present system of maintenance is good in principle, and now that the appropriations for maintenance in the next fiscal year do not specify a permanent force, we propose to make it work more advantageously than heretofore by reducing the number of camineros, keeping permanently only capable and experienced men as foremen in care of a larger section of road, their duties being, besides the vigilance of the roads, to direct intelligently all the labor of maintenance required, using therefor the necessary force of auxiliary laborers only when and where needed, under the supervision of experienced sobrestantes, who will also have a larger section of road to attend to. In this manner it is expected greater economy will be obtained in the cost of maintenance of the insular roads without impairing its efficiency, and a further reduction could be obtained by reducing to two the districts of maintenance.

In closing this concise exposition of the maintenance of our roads during this fiscal year, I desire to state that the introduction of the steam road rollers has been instrumental in producing fine and comfortable roadways greatly beneficial to traffic, from the fact that the consolidation of the metaling is completed in the shortest possible time, apart from the economy thereby afforded to transportation, the traffic is spared the burden of passing over stretches of movable broken stone, so injurious to the feet of animals and a source of much discomfort to travelers.

Unfortunately, on account of lack of bridges, the benefit of steam rolling can not yet be extended to all the roads, and the slow and expensive ox roller has still to be used in those sections where the steam roller can not be safely transported.

Appendices B, C, and D give in detail the service of maintenance in the districts of San Juan, Ponce, and Mayaguez.

The total expended for the 501.2 kilometers maintained has been \$197,374.38, as follows:

Permanent force	\$81,438.75
Auxiliary laborers.....	49,710.23
Broken stone, screening and rolling, etc	66,221.40
Total	197,370.38

VI.—PUBLIC BUILDINGS AND LANDS.

A.—MAINTENANCE AND REPAIR OF PUBLIC BUILDINGS.

The work done under this division is detailed in the appended report, "E," of the supervisor of buildings. It has consisted principally in repair work of the several insular buildings occupied by the several departments of the government of the island, the largest expenditure being in the completion of the plumbing and permanent repairs of the insane asylum.

The painting of the building called "diputacion," where the executive council, the house of delegates, the attorney-general, and other branches of the public serv-

ice have their quarters, has been let by contract, on account of the relative importance of its estimate, viz., \$1,077.55. After due advertising, bids were opened June 18, 1904, with the following results:

Alfonso Cruz, San Juan	\$1,023
Axtmayer & Son, San Juan	669
A. Nin y Martinez, San Juan	1,095
Guadalupe Flores, San Juan	899
Jack Katz, San Juan	1,360

The contract was awarded to the lowest bidder, Messrs. Axtmayer & Son, and contract entered into in June.

The light and water consumption in the public buildings has been about the same as last year.

B.—SURVEYS AND RECORDS OF HARBOR LANDS AND PUBLIC BUILDINGS.

The principal work done in this division was the survey for the determination of boundaries and area of landed property belonging to the people of Porto Rico in the municipality of Utuado.

An allotment of \$500 from the governor's miscellaneous fund, transferred to "contingent expenses" of the bureau of public works, provided for this work. For lack of funds other similar surveys could not be done.

The detailed account of the work on this division, as given by the surveyor of public lands and buildings, is attached to this report under Appendix F.

ROAD WORK IN CHARGE OF THE ROAD-DISTRICT SUPERVISORS.

Under provisions of the law enacted by the legislative assembly on March 1, 1902, the first road supervisors were elected November 4, 1902, for the seven road districts of San Juan, Arecibo, Aguadilla, Mayaguez, Ponce, Guayama, and Humacao, into which the island was divided.

The board of road supervisors, composed of three members for each district, organized as a body corporate under the name of each district, is placed in charge of the work of repairs and improvement of the vicinal and rural roads of their respective districts, comprised in a general plan of such roads, to be approved by the executive council.

This general plan is yet in course of preparation in this bureau on account of the languid efforts of the boards in sending the required data. Nevertheless some work has been done under these organizations of road supervisors, and in order to make their labors known to you in this writing I requested the chairmen of the boards of road supervisors to write a summary of the operations in their respective districts since their organization to date.

As it would be too long and tedious to append herewith these reports, written in Spanish and some of them with native verbosity, I only insert an abstract from those on hand at the time of this writing, as follows:

Abstract of work performed in the road districts under the boards of road supervisors from November, 1902, to June, 1904.

No. 1.—DISTRICT OF SAN JUAN.

Expenditures for the fiscal year are as follows:

Municipality of Bayamon: Repairs of 3 roads and 2 bridges	\$687.44
Municipality of Toa Alta: Repairs on 2 roads	426.49
Municipality of Comerio: Repairs on 1 road	160.00
Municipality of Manati: Repairs on 1 road	966.10
Municipality of Vega Baja: Repairs on 1 road	683.23

Total, 2,243.26

No. 2.—DISTRICT OF ARECIBO.

Municipality of Utuado: There have been repaired in this municipality 31 kilometers of vicinal and rural roads and 2 wooden bridges and several culverts constructed.

Municipality of Ciales: Repairs of 3.182 kilometers.

Municipality of Morovis: Repair of 1.343 kilometers after dry stone drains were built.

Municipality of Arecibo: Repair of 22.400 kilometers of roads and 2 bridges.

Municipality of Camuy: Repair of 7.446 kilometers of roads.

Grand total for the district of Arecibo, 65.371 kilometers of roads repaired. The expenditures for the work performed are not stated.

No. 3.—DISTRICT OF AGUADILLA.

Only reports that the sum of \$4,070.75 has been expended during the fiscal year 1903-4 in the repairs of the vicinal and rural roads of the district.

No. 4.—DISTRICT OF MAYAGUEZ.

Has failed to report.

No. 5.—DISTRICT OF PONCE.

In the municipality of Ponce 20.900 kilometers of vicinal and rural roads repaired; also 36 culverts and 12 small timber bridges built. Repair of timber pile bridge over Rio Marueño.

Municipality of Juana Diaz: Repair of 3.296 kilometers of road and several culverts.

Municipality of Coamo: Repair of 7.60 kilometers of road, and 15 drains built.

Total for the district of Ponce, 31.800 kilometers of roads repaired, including 48 large culverts and 17 drains, besides the surveys for convenient changes of location in certain portions in 10 different roads.

The total expenditure reported is as follows: Municipality of Ponce, \$6,900.86; municipality of Juana Diaz, \$2,120.60; municipality of Coamo, \$996.52. Total, \$10,-018.04.

No. 6.—DISTRICT OF GUAYAMA.

This district is the best organized; it has been subdivided in 3 divisions, each in charge of one of the road supervisors, as follows:

Division of Caguas: Comprises 3 vicinal roads and 10 rural roads. Works of repairs have been carried out in about 1.300 kilometers of the first and 6.400 kilometers of the second, with an expenditure of \$1,660.32.

Division of Aibonito: Comprises 8 vicinal and 20 rural roads. Repairs were made on 14.436 kilometers of vicinal roads and of 14 bridges thereon, and 23.662 kilometers of rural roads and 14 bridges. The total expenditure was \$4,353.39.

Division of Guayama: Comprises 4 vicinal and 20 rural roads. Repairs were made on 1.711 kilometers of vicinal roads and on 29.726 kilometers of rural roads. The expenditure was \$3,779.58.

No. 7.—DISTRICT OF HUMACAO.

Reports repair on 2 vicinal roads and on 8 rural roads, as follows:

Municipality of Humacao: Repairs on 12 kilometers of road; construction of 6 dry stone drains and 1 wooden bridge.

Municipality of Fajardo: Repairs on 2.537 kilometers of road and construction of 3 masonry culverts.

Municipality of Naguabo: Seven hundred meters of road repaired; 2 wooden bridges constructed and 5 repaired.

Municipality of Rio Piedras: Eight hundred meters of road repaired.

The work in the municipality of Carolina and Rio Grande of this district is not reported. The expenditure is not stated.

In all the districts the principal work of repair has been in the nature of filling mudholes, widening the formation, cutting ditches for drainage, repairs to timber bridges, and construction of small drains.

VII.—FRANCHISES.

The franchises granted by the executive council during the fiscal year 1903-4, notified to the bureau of public works, the plans examined in connection therewith for the approval of the commissioner of the interior or for information to the executive council, the projects for municipal works examined for recommendation to the governor, and permits for crossing public highways and for other uses of the public domain are as follows:

No. 1, October 15, 1903: Franchise granting the American Railroad Company of Porto Rico the right to construct a branch track to the town of Mayaguez.

No. 2, October 16, 1903: Franchise granting to Mr. Percy Saint the right to extract and market phosphate and guano on the islands of Mona and Monito.

No. 3, October 16, 1903: Franchise granting the Luz Electrica Company, of Ponce, the right to generate and sell electricity in the municipality of Ponce.

Under franchises granted in the present fiscal year and in previous years, plans have been submitted and approved as follows:

September 21, 1903: American Railroad Company of Porto Rico. Project for the construction of the section of road between Guayama and kilometer 62.640.

October 1, 1903: American Railroad Company of Porto Rico. Plan for a temporary wooden bridge of 80 meters span over the Portugues River.

August 26, 1903: The Vandergrift Construction Company. Map and profile of proposed railroad from San Juan to Playa Ponce.

October 20, 1903: American Railroad Company of Porto Rico. Plans for extension of line to Mayaguez.

December 29, 1903: Sociedad Anonima de Luz Electrica of Ponce. Sketch of streets on which the company proposes to extend its lines.

January 15, 1904: Sociedad Anonima de Luz Electrica of Ponce. Plans of the poles, with description of attachments.

February 2, 1904: American Railroad Company of Porto Rico. Plans for a switch of 150 meters in length connected with their track on the bulkhead, close by the pier of the New York and Porto Rico Steamship Company.

March 12, 1904: Ponce Light and Power Company. Plans for proposed spur track at Ponce Playa.

May 16, 1904: Porto Rico Railway Light and Power Company. Plans for two temporary bridges.

June 4, 1904: Porto Rico Railway, Light and Power Company. Map and profile of proposed line from San Juan to Martin Pena Canal.

EXAMINATION OF PLANS FOR MUNICIPAL WORKS AND OTHERS.

August 10, 1903: Municipality of Ponce. Project for extension of Plaza del Mercado in the city.

August 18, 1903: Attorney-general. Directs preparation of plans for building a new jail at Ponce.

August 20, 1903: Alcaldia of Ponce. Plans for the placing of a tablet with inscription in the Viaducto Otero.

September 14, 1903: Municipality of San Juan. Project for the alteration of the old sewer system of the city.

October 3, 1903: Municipality of Yauco. Project for the construction of a municipal slaughterhouse.

November 25, 1903: Municipality of Santa Isabel. Project submitted by Ramon Torres to establish a steam motor pump to raise water from the Caño Mejias for irrigating purposes.

January 26, 1904: J. Fantauzzi, of Arroyo. Plan for the construction of a telephone line between their office in Arroyo and their estates Felicita and Cuatro Calles.

March 11, 1904: Alcalde of Mayaguez. Plans for alterations to San Antonio Hospital.

April 7, 1904: Alcalde of Mayaguez. Project for repairs to aqueduct.

PERMITS FOR CROSSING PUBLIC ROADS AND FOR OTHER USES OF THE PUBLIC DOMAIN.

July 1, 1903: Sucesores de Frontera, of Mayaguez. Permit to enlarge a shed on the water front at Mayaguez.

July 4, 1903: Compania de Redes Telefonicas of Ponce. Permit to reconstruct their lines outside of the city limits.

November 4, 1903: Justo Barros, of Ponce. Permit to cross the central road near Juana Diaz with a portable railway for transportation of sugar cane from one plantation to another.

November 22, 1903: W. J. Lowrie, of Salinas. Permit to cross the Ponce-Guayama road with their track at kilometer 5 $\frac{1}{2}$ from Guayama.

December 30, 1903: Santiago Sambolin, of Mayaguez. Permit to cross the railroad track at kilometer 18, for transporting sugar cane.

January 2, 1904: manager Central Canovanas, of Carolina. Permit to cross the road near Rio Grande with a railway track between kilometers 22 and 23, for hauling cane.

February 17, 1904: W. J. Lowrie, manager Central Aguirre. Permit to cross the Ponce-Guayama road with their railroad track at kilometer 35.54, for the purpose of hauling sugar cane.

March 10, 1904: Marcos Calderon and five others. Permit to place a boat on the river Loiza near Carolina.

April 12, 1904: Ramon Valdes, of Catano. Permit to establish a branch track at Catano.

May 18, 1904: Justo Barros, of Ponce. Permit to make certain changes in the irrigation of La Reparada estate.

RAILROAD CONSTRUCTION IN PORTO RICO.

When the Americans took final possession of the island of Porto Rico, on October 18, 1898, the railways existing on the island and in operation were those built under a franchise with guaranteed interest by the Compañía de los Ferrocarriles de Puerto Rico, as follows:

	Kilometers.
San Juan to Camuy	100
Aguadilla to Mayaguez	54
Yauco to Ponce	35
Martin Pena to Carolina	14
Total	203

There were also two short lines under franchises granted to Pablo Ubarri and Ramon Valdes for tramways operated by steam power. The first was granted February 18, 1878, for sixty years, from San Juan to Rio Piedras, a distance of 12 kilometers. The gauge was 0.76 centimeter. The second, for a period of seventy years, from Catano to Bayamon, a distance of 7.5 kilometers, the gauge being 1 meter.

There was also a 2-foot gauge railway in operation between Mayaguez and Alto Sano, near San Sebastian, this being a portion of 17 kilometers of the line 45 kilometers long to be built between Mayaguez and Lares, via San Sebastian, under a franchise granted in the year 1896 to J. Tornabells. This road was opened to traffic in January, 1898, but was unsuccessful financially, and finally collapsed in December, 1902.

The Compañía de los Ferrocarriles de Puerto Rico, to settle its claims against the government of Porto Rico, had its franchise renewed under an ordinance of the executive council dated October 28, 1901.

The American Railroad Company of Porto Rico, successor of the old company, has continued construction under the new franchise, and 43 kilometers of railroad between Hormigueros and Yauco were opened in October, 1903, finally connecting the cities of Aguadilla and Mayaguez with Ponce and Yauco and giving great impulse to the sugar-cane industry by the facilities afforded to the transportation of cane to the different factories from the rich valleys traversed by the line. Several extensions of the track have been made as follows: From Carolina to central Buena Vista; from the main line near Arecibo to that town; from the main line in Mayaguez to the harbor of Mayaguez, and from the main line in Aguadilla to the harbor of Aguadilla.

Owing to damages inflicted by the floods during the cyclone of 1899 the company had to rebuild the following bridges: Across the Anasco River, of 80 meters span; across the Anasco River, of 25 meters span; across the Manati River, of 80 meters span, and across the Manati River, of 10 meters span. On La Plata bridge repairs to one of the abutments of the bridge and reconstruction of the embankments of the approaches.

The line from Ponce to Guayama comprised in the franchise of the American Railroad Company was assigned, with the consent of the executive council, granted by ordinance of July, 1902, to a corporation called "American Railroad Company, Central Aguirre Operator." The line is about 56 kilometers in length, of which over 25 kilometers have been constructed and are in operation for the transportation of sugar cane to the Central Aguirre.

The steam tramway from San Juan to Rio Piedras was bought early under the military government by an American company. The owners immediately, with American activity, wanted to improve the line and were subsequently authorized to widen the gauge, substitute electric for steam power, and build a loop track into the city of San Juan.

This trolley line now has a fifteen-minute service to Santurce at a uniform fare of 5 cents, and 10 cents to Rio Piedras, giving entire satisfaction to the public.

Its progressive and intelligent management has created an amusement resort by the seashore, about 1 kilometer off the insular road, called "Borinquen Park," which proves to be a great inducement to the residents of San Juan for outdoor relaxation, especially on Sundays and holidays. It has also been instrumental in the development of house building about Santurce and in enhancing the value of the landed property from San Juan to Rio Piedras.

The tramway from Catano to Bayamon has not had the same good luck as the above, and has for the present no prospect of improvement. Its rolling stock, composed of two small 7-ton locomotives, four passenger cars, and ten four-wheeled cargo cars, is the same, with the exception of two passenger cars, with which the road was opened for operation twenty-two years ago.

The permanent way is laid with light rails, which when new weighed 15 kilograms to the linear meter, fastened to wooden sleepers laid on ballast, to be, under the specifications, of broken stone or other suitable material.

As it is said under the head of "franchises," the technical inspection of the railways has been neglected for some reasons, with the result that when the former superintendent of public works, the able Mr. Stierle, after hearing several complaints, decided to make an inspection of this tramway a sad condition of affairs was revealed, as shown by the report of the inspector, from which I quote the following:

"The line is in bad condition, endangering the lives of passengers. Over 2,000 cross-ties are decayed, some totally rotten; many stretches of the track are without any ballast, and nowhere the broken-stone ballast specified is to be seen. All timber bridges are in bad condition, and the Aguas Frias bridge, 5½ meters span, is especially dangerous. With a slight pressure in one of the main girders a hole 8 centimeters deep was made, which gives an idea of the great peril menacing this bridge, the repair of which is urgent and imperative for public safety."

The superintendent of public works directed the manager to make repairs at once on the bridge, and within the shortest possible delay for the rest of the line.

So little regard to the safety of passengers, besides its high tariff, renders this conveyance at least objectionable. Its irregular one-hour service ending at 6 p. m., which can not be improved for lack of rolling stock, does not offer facilities for inviting the people of San Juan to favor Bayamon, in spite of the attractiveness of the country.

Mention should be made of the small 2-foot-gauge urban horse tramway built by the Compañía del Tramvia de Mayaguez in 1896, for service between the town and the playa, having a total development as originally constructed of nearly 7 kilometers, which was later, in 1897, extended 1.600 kilometers to Guanajibo Playa by another concession to L. Ninliatt. Only about 2 kilometers of this street tramway is now in operation and its traffic has decreased, owing to the depression of business at Mayaguez.

After the installation of the civil government in Porto Rico a franchise was granted by the executive council on February 27, 1901, to W. S. Lothrop, to establish and operate an electric street railway in the city of Ponce and between Ponce and Ponce Playa. The line has a gauge of 1 meter and a total development of over 6 kilometers. It began operations May 27, 1901, was opened to the public in May, 1902, and is working satisfactorily.

VIII.—MISCELLANEOUS.

Under this heading I desire merely to mention some labors of this bureau that have not found place in the preceding chapters.

Under the care of the chief clerk all vouchers, pay rolls, and accounts pertaining to the office and field operations are carefully examined, computed, and prepared for the signature of the superintendent, when they are recorded in the books and turned over to the disbursing officer for payment.

Over 6,000 vouchers have thus been passed upon during the fiscal year, besides quite a number of statements, balances, and correspondence relating to accounts.

In the drafting division 649 original plans and tracings have been made, 1,320 blueprints of plans, 140 different photographic plates, and 780 copies.

In this division the bureau has installed and in operation one recording barometer and one recording seismograph. The former gives a complete diagram wherein all variations of the atmospheric pressure at any moment of the day may be read. The seismograph registers the direction and duration of all earthquakes. There have been during the year only nine slight shocks registered, the maximum duration being one and seven-tenths seconds for one registered on July 26, 1903.

By the clerks in charge of the books of entries and orders over 3,000 orders and requisitions have been prepared for the supplying of tools, stationery, and other effects required for the extensive service of the public works in the whole island, and over 5,000 letters have been recorded and answered during the fiscal year.

The mimeograph installed in the office May 10 has been actively engaged since, and 300 copies of circulars, contracts, and specifications have been made.

In the division of property the inventories of all the personal property have been prepared in accordance with the recent law, approved March 15, 1904, entitled "An act to provide for the taking of an inventory of all personal property of the insular

government, and detailing a clerk in the office of the auditor who shall have charge of the records of such property."

Under another act of same date authorizing the sale of the building known as the "agricultural station" of Rio Piedras by the commissioner of the interior, in compliance with your instructions I had that property appraised by three respectable citizens, and recently reported to you for further action.

I also appointed, on May 11, 1904, two qualified appraisers for listing and appraising the insular personal property formerly belonging to the several harbor works and now in charge of the bureau of public works, in order to comply with the provisions of the law enacted May 10, 1904, authorizing the sale of all such property which will not be of further service to the public works. Most of this property is at San Juan and its appraisement is nearing completion.

RECOMMENDATIONS.

Perhaps, in my temporary position as acting superintendent of public works, with little chance, for lack of fitness, though for no lack of devotion to the task, of being designated to fill the responsible duties of the superintendent of public works, I had better leave to the future incumbent the honor of making the recommendations concerning the general policy to be followed with regard to the public works, as required by law; but having been requested by you to write the annual report of the operations of the bureau, a difficult task from the fact that my predecessor shone in that field so brightly, I feel compelled to comply with the requirements of the law and make a few suggestions which, in any event, could be modified or entirely disregarded were they not thought conducive to any advantage in the administration of the public works.

As to roads and bridges I would recommend that the list of 14 roads described before be considered as the general plan of the insular roads, the completion of which within the shortest possible period should be the aim of the bureau.

Nearly 549 kilometers of these roads are already completed and in maintenance, comprising the principal trunk lines and branches facilitating transportation to towns on the seaboard. These roads should be constructed in general under the specifications for cross sections, roadway, grades, etc., adopted for the main insular roads, the width of the formation to be no less than 6 meters, with 4.5 meters macadam at least 0.15 meter deep, these dimensions to be increased only near the principal towns of San Juan, Ponce, and Mayaguez, where the volume of traffic would justify such increase, and slightly decreased in the mountainous regions of the interior, where grades could also be adopted as high as 7 per cent, and even more in special cases for special reasons.

There remain still about 400 kilometers of these internal lines to be constructed, and for their construction a number of years and nearly \$3,000,000 will be required. How the funds needed will be supplied is a problem to be confronted by our legislative assembly.

On the completed roads there are a number of bridges much needed for the benefit of the traffic, sadly hampered by the lack of these structures, which would greatly favor rapid and economic transportation by suppressing many inconvenient and dangerous fords.

LIST OF BRIDGES REQUIRED.

Road No. 1: Across Rio Caguitas, near Caguas. Road No. 2: Across Rio La Plata, near Vega Alta. Road No. 5: Across Rio Valenciano, near Juncos; across Quebrada Mameyes, near Gurabo. Road No. 6: Across Rio Grande de Arecibo, near Utuado; across Rio Pellejas, near Utuado. Road No. 7: Across Rio Grande de Loiza, near Carolina; across Rio Mameyes, near Rio Grande; across Rio Grande de Loiza, near Rio Grande; across Rio Espiritu Santo, near Rio Grande; across Quebrada Candelaria, in Carolina; across Quebrada Polaco, in Carolina. Road No. 8: Across Rio Guajataca, near San Sebastian; across Quebrada Font, near San Sebastian. Road No. 9: Across Rio La Plata, near Comerio. Road No. 11: Across Rio Ciales, near Ciales; across Rio Morovis, near Morovis.

Their construction would involve an expenditure of about \$500,000.

(2) In regard to granting of franchises, presentation of plans and projects for same, and supervision of the work during construction and thereafter when in operation, I would make the following recommendations:

A set of instructions should be formulated for the presentation of projects and plans by the petitioners, in order that proper descriptions, plans, and specifications

be uniformly prepared, exposing clearly the convenience, possibility, and usefulness of the contemplated project; the subsequent construction plans should also be sufficiently detailed, and drawn to convenient scales for showing that the construction will be in accordance with the conditions set forth in the franchise. The petitioners should bear the expense incurred by the bureau in the examination of plans and projects submitted, the reconnaissance of the locality of the works proposed, and the inspection during construction and after completion, if deemed necessary. The Spanish laws, which to some extent are still in force, provided for the payment by the applicant at least for the expenses incurred outside of the office, as traveling expenses and engineer fees.

Under the Spanish laws all railroads in operation under franchises duly granted were subject to the law of railroads of 1889 and to the police law of railroads and regulations for its application of 1888, besides the special conditions in their respective concessions. The inspection and supervision was exercised by the "jefatura de obras publicas" as delegate of the governor of the island, and the regulations were enforced for the protection of the public welfare, health, and safety. Under new conditions obtaining after the American possession of the island, the enforcement of these regulations to make grantees comply with their respective franchises was neglected by the bureau, on account, perhaps, that it was not thought in consonance with American methods, for the governor was reluctant to impose upon the companies the fines which under the law and regulations they had incurred for breach of provisions of said laws or conditions in the franchises. The result is that some owners of these old franchises have begun to consider their railroads as private property and not as public institutions enjoying valuable privileges granted them by the people, and having for that reason corresponding duties and obligations to the people, which it is important to exact.

The first attorney-general of Porto Rico, the Hon. James H. Harlan, emitted the opinion that the control by the government established in the police law of railroads was not repealed by any express enactment and was still in force, "the jurisdiction under it lodged in the commissioner of the interior to be exercised by him through the board of public works, subject to the intervention of the Governor, as set forth."

The spirit in the Spanish laws is to obtain by a careful inspection and enforcement of the technical conditions during construction and operation all possible safety for the passengers and traffic which grantees, for ill-understood economy, would frequently neglect were they not compelled to by close supervision. This control of the governor and enforcement of good construction tends to prevent sad accidents, for which, however, the companies are responsible should any occur, in spite of the supervision.

In the United States the prompt action of the courts in placing responsibilities in case of accidents is a strong check to the greediness of unscrupulous managers, but the long and slow procedure of the Spanish tribunals made it necessary to provide in the railroad laws for the more expeditious intervention of the executive in behalf of the public welfare. It seems, therefore, proper to recommend that some legislative action be taken to enforce these railroad laws, after enacting the necessary amendments to tune them to present conditions.

(3) Section 406 of the Political Code provides that there shall be established in the bureau of public works a laboratory for the testing of materials used in the construction of the public works. For lack of proper appropriation in the regular budget the bureau has not been able to purchase any new testing apparatus, so our laboratory is quite in embryo—we have hardly the necessary outfit to make complete cement tests. Nevertheless, since the year 1900 we have examined about 20 different brands of cement and made over 2,000 tests. The convenience of the proper installation of the testing laboratory for the materials of construction is obvious, and I recommend that in every budget an adequate appropriation be made toward its completion and maintenance.

The following plans and documents are attached to this report:

1. Diagram showing road work accomplished in Porto Rico under the Spanish and American Governments.
2. Map of the island, showing the proposed general plan of insular roads, sections of same already constructed, under construction, or repaired; vicinal roads constructed or repaired by the bureau of public works; railroads in operation or constructed, and the division of the island in seven vicinal and rural road districts.
3. Views of road work and convict camps.
4. Appendix A, report of the disbursing officer, with table showing disbursements.
5. Appendix B, report of the San Juan district engineer.
6. Appendix C, report of the Ponce district engineer.
7. Appendix D, report of the Mayaguez district engineer.

8. Appendix E, report of the supervisor of buildings.
9. Appendix F, report of the supervisor of public lands and buildings.
10. Appendix G, list of bids and awards for 1903-4.
11. Appendix H, list of the local laws concerning the public works wholly or partially in force from October 18, 1898, to June 30, 1904.
12. Appendix I, business methods of the bureau shown in the construction of a section of road near Las Marias.
13. Appendix K, test made in the "road material laboratory" at Washington of twelve samples of rock used in road work in Porto Rico.

Respectfully submitted.

P. F. FERNANDEZ,
Acting Superintendent of Public Works.

Hon. W. H. ELLIOTT,
Commissioner of the Interior.

APPENDIX A.

REPORT OF THE DISBURSING OFFICER.

BUREAU OF PUBLIC WORKS,
San Juan, P. R., June 28, 1904.

SIR: In compliance with your instructions I have the honor to submit my report covering the period from July 1, 1903, to May 31, 1904.

In the annual report of the Commissioner of the Interior for the fiscal year 1902-3 will be found a complete description of the system employed in this office, and it seems unnecessary, therefore, to mention it again. The only real change in the general details of the office work has been in the payment of camineros by check. These were heretofore paid in the same manner as the laborers—that is, by means of cash put up in envelopes. Now, however, the day laborers are the only ones receiving pay in that manner. There has been expended in this way \$134,217.55 put up in 30,314 envelopes, the same degree of efficiency being maintained as was shown in previous years.

Accompanying this letter is a tabulated statement showing all of the expenditures of the Bureau of Public Works in accordance with appropriations and allotments.

No one could ask for better service than has been shown by the clerks under my control; they are without exception diligent, conscientious, and able, and to them is due any credit that may belong to the disbursing office of the Bureau of Public Works.

I am, very respectfully,

W.M. C. SMITH, *Disbursing Officer.*

Mr. P. F. FERNANDEZ,

Acting Superintendent of Public Works, San Juan, P. R.

REGULAR BUDGET.

Date.	Salaries.	Contingent expenses.	Maintenance and repair of roads.			Maintenance and repair of public buildings.			Executive mansion.			Total.												
			Office force.	Field force.	Purchase and repair of instruments and travel.	Rent of tool sheds.	Bridges, culverts, etc.	Broken stone, etc.	Preservation, etc.	Electric lights, etc.	Vouchers.													
Amount.	Vouchers.	Amount.	Amount.	Amount.	Amount.	Amount.	Amount.	Amount.	Amount.	Amount.	Amount.	Amount.												
Vouchers.	Amount.	Vouchers.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Total.												
July.....	\$2,301.52	\$1,751.72	4	\$9.60	9	\$144.98	1	\$39.17	31	\$108.50	11	\$860.75	2	\$92.50	17	\$299.29	2	\$314.48	20	\$373.47	4	\$5,012.25		
August.....	2,360.21	9,865.13	10	94.49	16	397.03	1	31	32	114.50	25	139.83	48	1,610.66	40	409.28	2	355.80	2	794.36	20	281.17	28	288.04
September.....	2,071.43	10,398.23	13	56.32	13	291.37	1	40.15	32	113.50	24	458.93	51	1,827.93	49	1,795.49	24	315.56	18	632.81	19	295.17	14	149.80
October.....	2,145.54	10,096.71	12	58.46	19	454.90	1	82.00	31	116.30	27	389.58	96	3,945.15	45	894.74	24	343.96	31	1,113.44	31	319.17	91	881.83
November.....	2,057.62	10,682.73	11	136.12	5	42.77	1	91.34	32	126.50	14	629.91	111	16,052.23	76	1,678.14	2	388.40	27	1,418.81	27	362.18	71	1,711.01
December.....	2,683.67	16,071.69	16	114.70	13	238.71	1	288.71	32	116.30	27	1,111.16	15	3,052.23	76	388.40	27	463.39	463.39	463.39	39	463.39	39	463.39
1904.																								
January.....	2,067.87	117	6,850.60	11	66.21	4	118.96	32	128.50	36	1,151.07	124	8,859.14	39	1,018.81	2	465.89	29	1,244.20	39	21,971.25			
February.....	1,896.65	137	12,448.76	9	127.11	7	106.05	38	143.50	14	435.60	134	10,295.84	50	869.97	2	518.30	32	1,869.51	427	28,711.29			
March.....	2,140.68	132	11,167.22	8	33.74	5	175.87	1	15.20	33	126.50	5	492.09	87	9,490.46	27	640.43	21	547.34	27	806.61	333	25,636.14	
April.....	2,088.74	119	10,381.79	6	119.74	11	309.90	7	22.00	2	14.00	49	2,163.86	28	1,130.10	2	479.41	19	942.16	19	249.17	646.70		
May.....	1,745.94	111	10,157.30	11	207.58	4	150.63	35	135.69	4	80.44	63	2,543.89	72	1,525.22	2	495.68	39	1,026.90	344	18,069.27			
Total.....	23,534.87	1,226.109	841.88	111,024.07	1062,431.17	5	267.86	363	1,134.49	162.6	632.20	810	57,955.47	477	10,617.29	20	4,189.91	265	10,992.29	3,541.228	621.48			

NO FISCAL YEAR

TRUST FUND.

Date.	San Ger- man-La- jas.		Caguas- San Lo- renzo.		Alibonito- Barran- quitas.		Mayaguez- Consumo.		Arroyo- Patillas.		Arecibo- Ponce.		Vega Alta.		Maneyes- Fajardo.		Faja o- Naguabo.		Consumo- Maricao.		Sabana Grand- San Ger- man.		Rio Pie- dras- Trujillo Alto.				
	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	
1903.																											
July.....	13	\$702.99	4	\$77.80	1	\$70.29	1	\$65.44	8	\$12.99	10	\$649.86	5	\$134.25	5												
August.....	27	1,746.00	35	2,452.54	1	\$11.00	2	\$21.55	3	200.97	6	5,124.24	18	1,099.64	1	50.50	1										
September.....	15	244.19	40	2,890.58	37	811.55	1	\$18.00	5	488.69	4	6,492.36	13	732.46	1	49.00	1										
October.....	32	3,082.06	52	3,728.34	52	1,188.34	31	\$26.33	2	146.80	4	5,778.63	6	630.85	1	50.50	1										
November.....																											
December.....																											
1904.																											
January.....	1	30.00	27	2,134.01	44	2,441.35	43	1,510.36	7	357.63	1	5,858.36	1	8.18	1	50.50	1										
February.....	1	9.94	1	1,625.52	34	2,987.99	30	1,829.59	8	712.63	1	2,516.95	1	2	163.37	1											
March.....	1	221.69	1	1,548.79	15	3,087.14	10	308.89	1	4,755.79	1	16.95	1	16.95	1	16.95	1	734.25	1								
April.....	3	86.58	1	249.71	16	1,298.06	3	157.82	2	198.95	1	5,054.60	1	321.80	1	26.59	1										
May.....																											
Total.....		824,252.69	199	15,000.00	207	14,924.01	233	13,026.84	442	864.76	151,201.85	61	71,992.55	70	4,710.84	947	278.47	2	91,779.8	640.48	24	1,452.30	20	1,418.31	31322,026.27		

TRUST FUND—Continued.

Date.	Adjuntas-Utuado.	Manati-Chales-Lot 2.	Mavilla River bridge.	San Sebastian-Lares.	Yauco-Sabana Grande.	Yabucoa-Mau-nabo.	Bayamon-Comerio.	Añasco River bridge.	Portuguez River bridge.	Ponce-Guayama.	Camuy-Aguadilla.	Naguabo-Naguabo Playa.	Mayaguez-Cabo Rojo.	Grand total.		
	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Vouchers.	Amount.		
1903.																
July																
Aug.	\$3,006.77	\$20.90	\$638.42	\$5,118.14	\$494.55	\$17,494.81	\$6,930.43	\$71.74	\$62,434.10	\$3,83.58	\$290.35	\$969.46	\$1,856.12	123 \$31,266.40		
Sept.	5,177.62	1	27,09	8	615.35	12	1,223.16	21	11,815.89	2	5,813.59	10	17.70	12	191 27,234.58	
Oct.	1,927.35	4	1,229.80	1	895.50	2	151.60	2	2,556.48	23	9,721.23	5	6.00	12	167 28,908.91	
Nov.	1,734	7	1,116.84	11	1,335.69	1	73.37	1	35.00	11	9,390.77	5	225.27	149 37,965.67
Dec.	2	77.40	5	720.82	1	23,103.55	.....	1	51.25	7	1,718.20	4	113.30	.....	177 26,909.84
														181 603.10		
1904.																
Jan.	7	855.44	.....	1	59.50	1	15.00	7	394.60	4	262.60	.....	7	234.84	155 12,162.37
Feb.	3	164.65	.....	1	121.21	1	44.20	9	620.74	5	267.83	.....	13	535.44	139 14,753.13
Mar.	9	70.75	.....	1	1,860.20	12	773.98	4	1,083.18	7	442.42	.....	2	155.49	195 19,433.94
Apr.	3	140.00	5	304.46	21	1,864.16	9	841.40	3	17,608.59	8	403.10	2	149.13	193 41,080.62
May.	4	117.59	17	1,087.18	53	2,815.87	15	807.45	.....	9	717.82	.....	30	1,237.09	356 28,097.67
Total.	2,6,934.69	7,652.86	93,000.00	40,26,028.42	147.20	634.89	88	7,140.82	71	76,778.44	50,6,719.45	10,4,092.80	125 11,046.57	192 10,999.67	351,003.02	34 2,503.46 2,026 333,416.23

RECAPITULATION.

Voucher.	Amount.
Regular budget	\$228,621.48
No fiscal year	267 21,220.76
Trust fund	2,026 333,416.23
Grand total	5,834 583,258.47

REPORT OF THE DISBURSING OFFICER FOR THE MONTH OF JUNE, 1904.

SAN JUAN, P. R., July 11, 1904.

SIR: I have the honor to transmit herewith report of the last month of the fiscal year 1903-4, together with a close estimate of the liabilities still unpaid for that year.

These unpaid liabilities consist of bills due at this time and contracts that will not be completed for some weeks to come, although entered into before the finish of the year.

I am, very respectfully,

Wm. C. SMITH,
Chief of Division and Disbursing Officer.

Mr. P. F. FERNANDEZ,
Superintendent of Public Works, San Juan, P. R.

BEGIJBUDGET

NO FISCAL YEAR.

TRUST FUND.

San German-Lajas.		Caguas-San Lorenzo.		Albonito-Baranquitas.		Mayaguez-Consumo.		Las Marias.		Arroyo-Patillas.		Areichobo-Ponce.		Vega Alta.		Mameyes-Fajardo.		San German-Pezuela Bridge.	
Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.
As per report rendered May 31, 1904.....	\$4,252.69	199	\$15,000.00	207	\$14,924.01	233	\$13,026.84	44	\$2,864.76	15	\$1,201.85	61	\$71,992.55	70	\$4,710.84	94	\$7,278.47	21	\$91,772
June	120.65	3	.....	1	75.99	17	920.62	4	154.10	1	3.00	4	2,109.94	.....	2,109.94	21	2,586.71	21	1,626.01
Total.....	4,373.34	199	15,000.00	208	15,000.00	250	13,947.46	48	3,018.86	16	1,204.85	65	74,102.49	70	4,710.84	115	9,865.18	23	1,717.78
As per report rendered May 31, 1904.....																			
June																			
Total.....																			
Fajardo-Naguabo.	Consumo-Mariela.	Sabana-Grande-San German.	Rio Piedras-Trujillo Alto.	Manati-Clales-Morovis Branch.	Adjuntas-Utuado.	Manati River San Sebastian-Lares, Lot No. 2.	Yauco-Saban Grande.												
Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Voucheers.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.	Voucheers.	Amount.
As per report rendered May 31, 1904.....	\$8,640.48	24	\$1,452.30	20	\$1,418.31	32	\$2,026.27	2	\$22.65	2	\$6,934.69	47	\$7,632.86	9	\$3,000.00	40	\$26,028.42	147	\$20,634.89
June	3,358.90	37	1,529.86	35	1,972.88	31	1,883.97	2	.....	2	120.07	3	120.07	.....	.....	36	2,313.31	9	270.72
Total.....	11,999.38	130	2,982.16	55	3,391.14	63	3,910.24	2	22.65	2	6,934.69	50	7,772.93	9	3,000.00	76	28,341.73	156	20,905.61

	Yabucoa-Maunabo.	Bayamon-Cocomero.	Añasco River Bridge.	Portuguez River Bridge.	Ponce-Guayama.	Camuy-Aguadilla.	Naguabo-Naguanilla Playa.	Maryaguez-Cabo Rojo.	Total.
	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.	Amount.	Vouchers.
As per report rendered									
May 31, 1904.....	88	\$7,140.82	71	\$76,778.44	50	\$6,719.45	10	\$4,092.80	125
June	13	853.80	1	5.21	2	890.49	....	....	....
Total.	101	7,994.62	72	76,783.65	52	7,609.94	10	4,092.80	156

RECAPITULATION.

	Vouchers.	Amount.
Regular budget 1903-4, including estimated liabilities	....	....
No fiscal year	3,916	\$275,052.77
Trust fund...	3,549	228,890.28
	2,405	361,381.07
Grand total, year 1903-4	9,870	865,324.12

APPENDIX B.

REPORT OF THE SAN JUAN DISTRICT ENGINEER.

BUREAU OF PUBLIC WORKS,
San Juan, P. R., June 30, 1904.

SIR: As the fiscal year draws to a close it becomes my duty to report to you the different works executed in the district of San Juan during the year and at the same time to submit to your wise consideration certain suggestions which though extending perhaps beyond the scope of my duties are nevertheless related to and affect in many respects the important economical problem of the maintenance of our roads.

From the results obtained during past years, and particularly during the last two years, I have arrived at the conclusion that if we propose to keep our roads in regular condition as heretofore very little economy might be hereafter obtained in the cost of maintenance as compared to the one resulting during the ending year.

The different methods of maintenance, varying generally in the different organizations of the service, and methods adopted in carrying out repair work, whether by contract or day labor, might be classified in two, as follows: "Periodical maintenance" and "Regular maintenance."

To repair roads periodically, or at times only, following the first method, would demand large expenditures at that special time when the roads through long wear and tear and neglect are in such a poor condition that it becomes imperative to restore them to their original cross section. This method has been abandoned in many countries owing to the fact that immediate repairs are impossible in times of excessive rainfall, when great damages frequently occur on the roads through the effects of the rains. Again, it would be impracticable to apply that method to Porto Rico for economical reasons.

Only in large countries of vast wealth and resources could such system of maintenance be applied, though the prevailing opinion among those who have taken up the matter reject it.

On the other hand, all engineers agree to-day that the "regular maintenance" is the least expensive, following the principle that a stitch in time saves nine, for it is easier and cheaper to patch up small holes as they appear than to allow the formation of gullies, mud holes, or any other serious disintegration of the road surface.

Keeping these facts before us it is easy to realize that if we must keep our roads in fair condition it is necessary to count with the means to get at any time the materials and labor required to attend to the repairs of the road at once, when needed. In this connection I would add that it would be somewhat difficult to determine beforehand the amount of stone required to maintain 1 kilometer of road during the year, even if we admit that the road is in excellent condition upon being turned over for maintenance, the estimate depending largely upon the quality of the stone used and the amount of traffic over the road. But taking for granted that we possess all this information it is difficult to appreciate to a certainty the wearing off of a road during the year, for even if we measure directly on the road the reduction in thickness of the material the results obtained would be in my opinion far from being accurate.

Observation of facts, however, compels us to admit that under ordinary circumstances and with materials of average consistency, which are the most adequate for road building, as limestone, at least 40 or 50 cubic meters of crushed stone are necessary to maintain 1 kilometer of road during one year.

The service of maintenance does not consist exclusively in the continuous patching up of the road surface. We have to struggle in Porto Rico with two formidable enemies of our roads—the heavy rains peculiar to the country and its exuberant vegetation, which grows and spreads rapidly during all seasons of the year. The rains are the cause of much damage to the roads and sometimes to a considerable extent to the masonry work, ditches, slopes, etc. As to the vegetation, it is a great obstacle to the proper drainage of the road.

The yearly sums appropriated in the regular budget for the maintenance of roads, far from being excessive, are very limited and will only permit a very slow improvement in the conditions of a certain number of our roads. It will require some time before some sections could be materially improved.

The same should be said with regard to certain masonry works and defense works which need repairs.

Consequently if the island of Porto Rico needs now an annual appropriation of \$180,000, more or less, to attend to the maintenance of the 600 kilometers already built, nearly \$500,000 would be required the day when, meeting the pressing demands

of our increasing traffic all over the country, we have accomplished the plan of building the principal roads of the island.

Communication between the different localities of the island depend mainly on our roads, for though there are a few kilometers of railroad in operation this is restricted to a comparatively small area with regard to the rest of the island, the general traffic being served through our trunk lines and country roads.

Road construction, however, does not meet efficiently the demands of modern life and activity. Economy in cost is an important factor in its favor, but this does not compensate the economy in time and money which rapid transportation affords to commerce and the public in general; besides that, roads are always a heavy and constant burden to the public treasury.

Railroad construction is more expensive, but once in operation generally yield sufficient profits to pay the cost of maintenance, being in many cases an important source of wealth and very seldom a charge to the public treasury.

The maintenance of our roads is a serious problem that we will have to confront in the near future if road building is to be continued at the same rate of progress as started since the American occupation; and now I would ask if the time has not arrived to consider carefully the convenience of developing in Porto Rico a system of railroads upon an economic plan, which could be undertaken by the island under subsidy of interest or through franchises to public corporations or private parties upon the same basis of a guaranteed interest by the island.

The enormous reduction in rates for long-distance transportation in the United States has attained such proportions as to make it possible to haul any kind of merchandise over a distance of 50 miles on a railroad line for the same amount that would be charged for 1 mile on any kind of conveyance drawn by animal force.

The American Government has loaned a protective hand to long-distance railroads, such as those crossing the vast plains of the West and those going through the mountains on the Pacific coast. There are many countries in Europe whose governments subsidize hundreds of kilometers of railroad lines.

My remarks on this subject do not tend to establish the criterion that we should discard altogether road construction and substitute it by railroads. There are many cases in which local and other conditions would advise the construction of a road instead of a railroad line. However, I wish to point out that the time is drawing near when we should adopt a policy for the future with regard to prospective construction of roads in Porto Rico and their adequate maintenance consistent with the financial resources of the island.

There has been during the present year an increase of 39 kilometers of new roads turned over to maintenance in the district of San Juan, which is now divided into 16 sections, as against 13 during the past fiscal year.

The actual length of roads under maintenance in the district amounts to 275.3 kilometers, classified as follows:

TABLE No. 1.—*Sections of roads under maintenance in the district of San Juan and permanent force employed therein, from July 1, 1903, to July 1, 1904.*

Road No.	Section.	Length.	Camino- neros, at \$240.	Capa- taces, at \$360.	Sobres- tantantes, at \$900.	Watch- men, at \$360.	Engine- driver, at \$720.	District engi- neer, at \$1,800.
		Kms.						
1	San Juan to kilometer 21	21	7	2	1	1	1	
1	Kilometer 21 to kilometer 45	24 ¹ 27	8	2	{ 1	.....	.....
5	Caguas to Rio Grande Loiza	3 ¹ 27	1	.....	1	.....	.....
1	Kilometer 45 to Cayey	16	5	1	1	1	1	
2	Catano to Vega Alta	27 ¹ 58	9	1	1	.....	.....
10	Reyes Catolicos to Corozal	17 ¹ 58	6	1	1	.....	.....
9	Bayamon to Rio Plata	14 ¹ 4	4	1	1	.....	.....
5	Rio Grande Loiza to kilometer 21	18	6	1	1	.....	.....
5	Kilometer 21 to Humacao Playa	18	6	1	1	.....	.....
6	Arecibo to Utuado	32	11	2	1	.....	.....
6	Utuado to Tallones	13	5	1	1	.....	.....
7	Rio Piedras to Mameyes	32	10	2	1	.....	.....
9	Comerio northward	4	2	1	.....	.....	.....
11	Manati to Ciales and Morovis Branch	19	6	1	1	
7	Mameyes to Naguabo	11	5	2	
7	Yabucoa to Maunabo	6	1	
Total.....		275	91	20	10	2	2	1

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The auxiliary force employed for the different labors in the district during the year may be estimated at 216 per day, upon the basis of 300 working days in the year, and \$0.45 wages to each man per day.

The average length in charge of each employee is as follows:

	Kilometers.
For 1 sobrestante.....	27.50
For 1 capataz	13.80
For 1 caminero.....	3.00
For 1 auxiliary.....	1.274

The average expenditure during the fiscal year in the district has been \$391.26 for 1 kilometer of road.

The composition of the average prices obtained is shown in detail in the following table, classified by items and sections:

TABLE No. 2.—Average prices obtained per kilometer for each item in the different sections of the district of San Juan during the fiscal year 1903-4.

Road No.	Section.	Perma-nent force.	Auxiliary force.	Rent of houses.	Repairs to road houses.	Repairs to bridges and culverts.	Broken stone.
1	Kilometer 0 to kilometer 21.....	\$157.143	\$124.134	\$2.286	\$33.821	\$3.284	\$230.619
1	Kilometer 21 to kilometer 45.....	147.500	152.424	1.875	8.501	69.181	210.000
1	Kilometer 45 to Cayey.....	152.528	79.916	3.000	.....	.....	118.750
2	Cataño to Vega Alta.....	110.000	12.843	4.000	14.369	.....	28.519
9	Bayamon to Rio Plata.....	27.273	41.014	2.657	.....	.....	.....
5	Caguas to Humacao Playa.....	144.615	94.910	1.841	3.929	6.552	101.026
6	Arecibo to Utuado.....	133.125	105.830	.....	.....	20.188	5.363
6	Utuado to Tallones.....	189.231	295.801	2.769	.....	.....	28.269
7	Rio Piedras to Mameyes.....	125.625	81.884	7.656	.258	15.931	70.760
7	Mameyes to Naguabo.....	127.417	73.653	4.455	.....	3.659	.....
7	Yabucoa to Maunabo.....	29.933	87.258	9.333	.....	.....	.....
9	Comerio northward.....	210.000	23.725	12.000	.....	.....	37.500
10	Reyes Catolicos to Corozal.....	132.353	138.235	15.529	.....	4.024	162.647
11	Manati to Ciales to Morovis branch.....	131.953	48.037	.....	.....	.....	73.158
General average, by items...		131.488	105.892	3.839	5.317	11.803	85.728

Road No.	Section.	Steam rollers.	Carts and ox teams.	Other materials.	Stamps.	Total averages, by sections.
1	Kilometer 0 to kilometer 21.....	\$63.118	\$41.262	\$1.676	\$0.095	\$657.438
1	Kilometer 21 to kilometer 45.....	34.059	26.594	1.270	.208	651.612
1	Kilometer 45 to Cayey.....	23.361	16.675	1.269	.187	395.686
2	Cataño to Vega Alta.....	27.517	11.421	1.761	.....	300.431
9	Bayamon to Rio Plata.....	.....	8.706	.....	.....	79.660
5	Caguas to Humacao Playa.....	6.418	23.905	1.168	.026	384.390
6	Arecibo to Utuado.....	53.092	7.525	1.291	.125	326.538
6	Utuado to Tallones.....	.....	225.954	12.505	.231	754.760
7	Rio Piedras to Mameyes.....	13.085	3.085	2.285	.219	321.778
7	Mameyes to Naguabo.....	.....	10.909	1.318	.273	221.684
7	Yabucoa to Maunabo.....	.....	10.500	.334	.....	137.358
9	Comerio northward.....	.....	.675	1.745	.375	286.020
10	Reyes Catolicos to Corozal.....	.....	3.412	.....	.....	456.200
11	Manati to Ciales to Morovis branch.....	.....	3.053	5.655	.053	261.909
General average, by items ...		20.442	24.393	2.248	.111	391.261

The total length of road repaired amounts to 26.997 meters, in which work there has been used 15,226 cubic meters of crushed stone out of the 18,896 cubic meters purchased and delivered along the different sections of road in the district.

The average expenditure incurred in the employment of 1 cubic meter of broken stone has been \$2.509, or \$1.714 for material and \$0.795 for labor.

The 18,896 cubic meters delivered along the roads of the San Juan district have been distributed as follows:

TABLE No. 3.—*Amount of broken stone delivered in the district of San Juan during the year 1903-4.*

Road No.	Section.	Broken stone.				Total broken stone.
		From previous year.	Purchased by contract.	By day labor.		
1	San Juan to kilometer 21.....	Cub. meters. 750	Cub. meters. 2,650	Cub. meters.	Cub. meters. 3,400	
	From kilometer 21 to kilometer 45.....		3,000		3,000	
1	From kilometer 45 to Cayey.....		1,000		1,000	
2	Cataño toward Vega Alta.....	500	500		1,000	
5	Caguas to Rio Grande Loiza.....		900		900	
5	Rio Grande Loiza to kilometer 21.....		1,000		1,000	
5	Kilometer 21 to Humacao Playa.....		300	225	525	
6	Arecibo to Utuado.....	1,878	143	..	2,021	
6	Utuado to Tallones.....	1,780	250		2,030	
7	Rio Piedras to Mameyes.....		1,400		1,400	
7	Mameyes to Fajardo.....					
9	Bayamon to Rio Plata.....		100		100	
9	Comerio northward.....					
10	Reyes Catolicos to Corozal.....		1,520		1,520	
11	Manati to Ciales.....		1,000		1,000	
	Total.....	4,908	13,763	225	18,896	

The remaining balance of 3,670 cubic meters from the stone purchased and the amount used is distributed along the roads as follows:

TABLE No. 4.—*Quantities of stone on hand along the different roads in the district on June 30, 1904.*

Road No.	Section.	Quantity on hand.	
		Cub. meters.	
1	San Juan to kilometer 21.....	1,050	
7	Rio Piedras to Mameyes.....	400	
9	Comerio northward.....	100	
10	Reyes Catolicos to Corozal.....		1,320
11	Manati to Ciales.....		800
	Total.....		3,670

The stone purchased by contract has been divided into 19 lots, as shown in Table No. 5.

TABLE No. 5.—*Broken stone purchased by contract during fiscal year 1903-4.*

Lot No.	Contractor.	Stone (cubic meters).	Price per cubic meter.	Total cost.	Road No.	Section.
1	Roque Paniagua.....	1,600	\$1.78	\$2,848.00	1	1
2	....do.....	3,000	1.68	5,040.00	1	2
3	....do.....	1,000	1.90	1,900.00	1	3
4	José Cuesta.....	500	1.54	770.00	2	1
5	Juan Perez.....	900	1.85	1,665.00	5	1
6	Raul Marix.....	1,000	1.69	1,690.00	5	2
7	Julio B. Janer.....	300	1.95	585.00	5	3
8	Serafin Soto.....	1,000	1.56	1,560.00	7	1
9	....do.....	400	1.76	704.00	7	1
10	José Cuesta.....	200	1.65	330.00	10	1
11	Raul Marix.....	1,000	1.39	1,390.00	11	1
12	Conrado Palau.....	100	1.50	150.00	9	2
13	Marix & Co.....	143	1.20	171.60	6	1
14	Isidoro Louell.....	250	1.47	367.50	6	2
15	Inocencio Sanchez.....	500	2.00	1,000.00	10	1
16	....do.....	540	1.75	945.00	10	1
17	....do.....	280	1.75	490.00	10	1
18	J. Balado.....	525	1.90	997.50	1	1
19	José Rosado.....	525	1.90	997.50	1	1
	Total.....	13,763	a 1.714	23,601.10		

a Average.

The work done with steam rollers Nos. 1 and 4, belonging to the bureau, and average cost obtained, is given in the following table:

TABLE No. 6.—*Statement of work done and results obtained with the two steam rollers Nos. 1 and 4 during fiscal year 1903-4.*

		Roller No. 1.	Roller No. 4.	Total.
Work done:				
Length remetaled.....	linear meters.....	5,504	6,143	11,647
Surface rolled.....	square meters.....	29,722	32,572	62,295
Average width remetaled.....	linear meters.....	5.4	5.3	.....
Average thickness.....	do.....	0.112	0.121	.....
Time employed.....	days.....	97	98	195
Materials:				
Broken stone used.....	cubic meters.....	3,350	3,956	7,306
Coal.....	tons.....	24	17.60	41.6
Wood	cubic meters.....	4	45.45	49.45
Expenses:				
Personal.....	\$329.80	\$338.61	\$668.41	
Puel.....	224.00	376.32	600.32	
Grease, oil, oakum, etc.....	36.19	29.66	65.85	
Water	3.25	157.30	160.55	
Repairs.....	2.95	18.72	21.67	
	596.19	920.61	1,516.80	
AVERAGES.				
Per square meter rolled.....	\$0.020	\$0.028	\$0.024	
Per linear meter of road .....	.108	.149	.130	
Per cubic meter of stone used.....	.178	.232	.207	

In making the history of the work accomplished during the fiscal year in the district of San Juan under my charge, reference will be made only to the most important operations carried out on each section of road, omitting for sake of brevity the general routine work in connection with the service of maintenance, such as road cleaning, repairs of ditches, sidewalks, etc., which has been attended to and executed in the most practical manner.

ROAD NO. 1.—SECTION 1, FROM SAN JUAN TO KILOMETER 21.

[Length, 21 kilometers].

In my previous reports for last fiscal year I dwelt upon the importance of this section of road, which bears the heaviest part of the traffic because of its proximity to the capital of the island, it being the only outlet leading to a great number of adjoining towns, and consequently the forced passage for all vehicles, public as well as private, entering and leaving the city.

It is therefore obvious that this section of road demands special attention, requiring heavy expenditures, for repairs must be made constantly in order to keep it in fair condition for traffic.

During the past fiscal year the road surface was repaired in a length of 3,440 linear meters, of a width of 5.50 meters and an average thickness of 0.124 meter between kilometers 2 and 3 and from 10 to 21. There have been used in these repairs 2,350 cubic meters of broken stone, at the cost of \$2.58 per cubic meter, of which \$1.78 represents the cost of the material and 80 cents for labor, including steam roller.

Out of the 2,350 cubic meters of broken stone used, 750 cubic meters belonged to last year's appropriation, and the balance of 1,600 cubic meters was purchased by contract this year. (Lot No. 1, Table No. 5.) An additional amount of 1,050 was purchased lately, to be used during the early part of the coming year. (Lots Nos. 18 and 19, Table No. 5.)

The culvert at kilometer 2.330, which has been for some time in a ruinous condition, was reconstructed, enlarging its span and improving the condition of the culvert throughout, at a cost of \$61.31.

Extensive repairs were made to caminero houses Nos. 5, 6, and 7, located at kilometers 13.600, 16.752, and 19.165, respectively. This work was carried out by contract for the amount of \$710.

The following works are recommended in this section of road during the coming year:

Broken stone.—Two thousand one hundred cubic meters will be needed for patch-

ing and remetaling, to be employed as follows: Four hundred cubic meters between kilometers 0 and 12 and 1,700 cubic meters between kilometers 12 and 21.

Bridges and culverts.—Painting of the iron material of the San Antonio Bridge, at kilometer 3.700; small repairs to "Los Frailes" Bridge, at kilometer 18.900; and to culverts at kilometers 11.655, 17.970, 19.659, and 19.732. Also construction of 1 concrete pipe at kilometer 19.900.

ROAD NO. 1.—SECTION 2, FROM KILOMETER 22 TO KILOMETER 45.

[Total length, 24 kilometers.]

The most important works executed in this section of road have been the following: A length or 4,621 linear meters has been remetaled, of 5.40 meters width and average thickness of 0.124, between kilometers 27 and 36, in which work 3,000 cubic meters of broken stone were used. (Lot No. 2, Table No. 5.)

The average cost obtained has been \$2.45 per cubic meter, or \$1.68 for material and 77 cents for labor, including screening and rolling with steam roller.

Important repairs were done to bridges "Bairoa 1" and "Bairoa 2," at kilometer 33.6, which were practically falling down. The heads of all beams were reenforced and the flooring and railings reconstructed with ausubo wood. One wing wall of Bairoa Bridge was reconstructed to replace the one destroyed, and, finally, the abutments of the two bridges were underpinned. Turabo Bridge, at kilometer 38.9: Two decayed beams were changed for new ones and repairs made to the railings and other small pieces of the bridge, which were in bad condition.

The total expenditure incurred in the repairs of the above bridges amounted to \$1,250.

Road house No. 1.—This house, located at kilometer 26.5, was destroyed during the cyclone of 1899 to such an extent that only the four walls of the inclosure were left standing, the rest of the material having disappeared. The reconstruction of this house, which would be tantamount to a new construction, would cost \$355.

The following works are recommended for next fiscal year on this section of road:

Broken stone.—Amount needed will be 2,600 cubic meters for repairs at kilometers

24, 29, 30, 31, 32, and 43.

Bridges and culverts.—1. Caguatas Bridge, kilometer 35.1: This bridge has demanded our constant attention during the year, continuous repairs having been going on, owing to the recurrent damages which the frequent floods of the river caused to the structure. In last year's report I called attention to the unsatisfactory condition of this bridge, which, being of a temporary nature, should be reconstructed or replaced by a permanent bridge.

2. Turabo Bridge, kilometer 38.9: This bridge, although it has undergone some repairs during the year, has been only partially repaired for lack of sufficient funds. All beams should be changed for new ones, and also the flooring and railing, which is in bad condition.

3. Rio Cañas Bridge, kilometer 28.160: The paving of this bridge is in bad condition and should be repaired; also the abutments, which have been undermined and need underpinning.

4. The repair of the following culverts is urgent, and should not be delayed any longer, as they are all more or less undermined and are dangerous: Kilometer 21.300, culvert of 4.50 span; kilometer 21.500, culvert of 1.60 span; kilometer 21.800, culvert of 1.85 span; kilometer 21.150, culvert of 0.70 span.

ROAD NO. 1.—SECTION 3, FROM KILOMETER 45 TO CAYEY.

[Length, 16 kilometers.]

The amount of stone used during the year on this section of road has been 1,000 cubic meters, designated as lot No. 3 in Table No. 5. This stone was almost totally used in patching and repairing small stretches on this section, covering a length of about $2\frac{1}{2}$ kilometers, at a cost of \$2.477 per cubic meter of stone, or \$1.90 for stone and \$0.577 for labor.

The most important works to be done on this section during 1904-5 are the following:

Patching and remetaling at kilometers 45 to 53, which will require 1,000 cubic meters of broken stone; painting of the iron material of bridges "Beatriz," "Mercedes," and "La Plata," located at kilometers 54, 56, and 57, respectively; repair of caminero houses Nos. 15, 16, and 17.

ROAD NO. 2.—CATAÑO TOWARD VEGA ALTA.

[Length, 27 kilometers.]

Three kilometers of new road has been added to this section during the year, which was constructed during August and November of 1903, with an allotment of \$5,000 granted by the governor from the "trust fund."

With funds from the regular budget a piece of road 1,660 meters long, 5 meters wide, and an average thickness of macadam of 0.12 meter was repaired, using therefor 1,000 cubic meters of broken stone, of which 500 meters belonged to last year's purchase and the other 500 from amounts contracted during the present year. (Lot No. 4, Table No. 5, in this report.)

The cost of this work has been at the rate of \$2.367 per cubic meter of stone used, \$1.54 being the corresponding value of the material and \$0.827 for labor.

Road houses Nos. 1 and 2 were repaired, at an expenditure of \$556.

I would recommend the following work during next year on this section of road:

Broken stone.—One thousand five hundred cubic meters of broken stone will be needed for patching and remetaling different portions of the road.

Bridges and culverts.—Repairs of 2 wooden bridges located at kilometer 3.

Painting of the iron material of the bridge across the Bayamon River.

The spanning of the river Plata by an iron bridge is a pressing necessity, more felt every day. This bridge should be erected at about 1 kilometer southward of the present ford, and the material of the old bridge, "Reyes Catolicos," could be used advantageously in the new structure.

Road houses.—Houses Nos. 3, 4, and 5 need repairs.

ROAD NO. 5.—CAGUAS TO HUMACAO PLAYA.

[Length, 39 kilometers.]

The amount of broken stone used on this section of road has been, during the year, 2,425 cubic meters, of which 2,200 were purchased by contract (lots Nos. 5, 6, and 7 in Table 5), the balance of 225 cubic meters being obtained by day labor.

The stone was distributed as follows: From kilometer 0 to 3, 200 cubic meters; from kilometers 5 to 8, 1,000 cubic meters; from kilometers 22 to 23, 525 cubic meters.

The total length repaired amounts to 3,897 linear meters, of a width of 5 meters and an average thickness of macadam of 0.118, at the rate of \$2.56 per cubic meter, or \$1.717 for the value of the stone and \$0.843 for labor, including spreading, screening, and rolling.

On May 26, 1903, a contract was entered into with D. M. Palmieri for the repair of 34 culverts along this road. The work contracted consisted in the construction of connecting walls in foundations and paving in 33 culverts; also the reconstruction of a culvert of 2.50 meters span which had been destroyed some time past.

The work commenced in June, 1903, and was completed in September of the same year. The sum appropriated for this work amounted to \$7,000, the final liquidation of the contract showing an expenditure of \$6,357.32.

RECOMMENDATIONS REGARDING THIS ROAD.

Broken stone.—I would recommend that 4,000 cubic meters of broken stone be purchased for repairs at kilometers 3, 5, 12, 15, 16, 17 to 21 and 33 to 39.

Bridges.—In my previous report I said the following in connection with bridges and culverts:

"There are on this road three river crossings which should be spanned by bridges without further delay: The River Grande of Loiza, at kilometer 3; Quebrada Mamey, at kilometer 10.2, and the Rio Valenciano, at kilometer 14.1.

"As a permanent structure across the River Grande of Loiza and River Valenciano would be expensive enterprises, I would recommend the construction of two submersible wooden bridges, which would save for some time to come actual inconvenience caused to traffic by the lack of bridges across these streams.

"With regard to Quebrada Mamey, I would suggest the construction of a bridge 10 meters span, of native timber upon masonry abutments."

The construction of these bridges being more and more urgent every day, I insist upon recommending that the matter be carefully considered in order that the above works be undertaken at the earliest possible date.

ROAD NO. 6.—SECTION FROM ARECIBO TO UTUADO.

[Length, 32 kilometers.]

The following work has been executed on this road:

Remetaling.—From the time of the military government there had been placed along this road, between kilometers 26 and 31, about 1,878 cubic meters of broken stone, which, added to 143 cubic meters purchased during the present year (lot No. 13, Table No. 5), aggregated 2,021 cubic meters, representing the amount used on this section of road during the ending year.

The total length repaired has been 4,090 linear meters of road, of a width of 5 meters and an average thickness of 0.10 meter.

This work has been accomplished at an average cost of \$2.19 per cubic meter of stone used, or \$1.20 for the value of the material and \$0.99 for labor.

Bridges.—The flooring of 8 bridges were repaired, between kilometers 27 and 30, at a cost of \$646.03.

There will be needed for this section during the coming year 1,500 cubic meters of broken stone to be used in patching and remetaling different portions of the road.

I would recommend the construction of a new bridge across the Rio Grande of Arecibo, at the entrance of the town of Utuado, where a bridge 42 meters span was erected during the Spanish government. This bridge was carried away by the floods during the cyclone of 1899.

ROAD NO. 6.—SECTION FROM UTUADO TO TALLONES.

[Length, 13 kilometers.]

In my previous report the conditions of this section of road were explained, stating that in the first 8 kilometers south of Utuado there still existed some unfinished portions, the construction of which was at that time under way by day labor.

During the ending year these gaps have been filled with the completion of said unfinished portions, with the exception of bridges.

The stone used amounted to 2,030 cubic meters, covering a length of 3,720 linear meters of road.

The total expenditure incurred in the construction of the unfinished portions and in the maintenance of the part already built amounted to \$9,811.88.

My only recommendation for this road will be the construction of bridges across Quebrada Arena and Pellejas River.

ROAD NO. 7.—SECTION FROM RIO PIEDRAS TO MAMEYES.

[Length, 32 kilometers.]

One thousand four hundred cubic meters of broken stone were delivered by contract along this section of road during the year. (Lots Nos. 8 and 9, Table No. 5, of this report.) Out of this amount 1,000 cubic meters were used between kilometers 2 and 11, the balance of 400 being destined for kilometers 22 and 26.

The length of road remetaled amounts to 2,269 linear meters, of a width of 4.50 and an average thickness of 0.097 meter.

In these repairs we used the steam roller in a length of 1,353 linear meters and ox rollers in the remaining 916 meters.

This work was done at an expenditure of \$2.26 per cubic meter, including labor and material and \$0.70 for labor only.

Extensive repairs were done to caminero houses Nos. 1, 2, 3, 4, and 5, by day-labor, at a total cost of \$600.

The most important works for next fiscal year will be—

Broken stone.—One thousand seven hundred cubic meters are need for repairs at kilometers 1 and 3 and from kilometer 8 to 21.

Bridges and culverts.—Much should be done in this line on this section of road, and I would recommend the following:

1. The bridge 9.80 meters span at kilometer 18.249 should be protected from constant undermining, which will end in serious damage if neglected.

2. Repair of wooden flooring of the 8 following culverts: At kilometers 9.310, 11.850, 19.670, 20.120, 20.890, 22.857, 23.586, and 23.910.

3. Construction of connecting walls in foundations and paving of the 5 following culverts: At kilometers 28.185, 29.175, 29.576, 29.738, and 32.400.

4. Culvert of 6 meters span at kilometer 12.990 across Quebrada Candelaria. This culvert is entirely destroyed and its reconstruction is recommended.

5. Herrera Bridge, 7.3 meters span, at kilometer 22.625. This bridge could be reconstructed, using its present iron material.

6. Scraping and painting the iron material of 13 bridges, with an aggregate square surface of 2,700 square meters.

7. The Canovanas River is threatens to cut off the road at kilometer 18.7; it is therefore urgent to construct a wall with riprap foundation to protect the embankment of the road during high floods.

There are three important streams lacking bridges on this section of road, as follows: Rio Grande de Loiza, in Carolina; Rio Grande, in Rio Grande, and Rio Espiritu Santo.

We are now running a ferry in Rio Grande de Loiza at a yearly expense of \$700.

According to information obtained, from September 1 to May 15, 1904, the average number of pedestrians and riders who cross the river daily amounts to 880, and about 15 coaches and 11 carts—a traffic which, in my opinion, justifies the erection of a bridge in that place.

ROAD NO. 7.—SECTION FROM MAMEYES TO NAGUABO PLAYA.

[Total length, 37 kilometers, of which there are only 11 kilometers under maintenance.]

This section of road was turned over to maintenance in July, 1903.

The work accomplished on this road during the year has been done at a small cost, owing to the aid given by landowners in the vicinity of the works, who furnished carts for hauling gravel and other material free of charge.

The conduct observed by Messrs. Veve, Sandoz, Massó, and others deserves commendation, and should be imitated by many other estate holders of the island, who ought to cooperate in like manner to the improvement of our roads, from which they derive direct benefits by promoting their own interests through facilities afforded to transportation.

The total amount expended on this work has been \$2,438.52.

ROAD NO. 9.—COMERIO NORTHWARD.

[Length, 4 kilometers.]

This section of road, actually in charge of 1 capataz and 2 camineros, is in regular condition of maintenance.

There has been purchased 100 cubic meters of broken stone to be used on this section during the coming year. (Lot No. 12, Table No. 5.)

ROAD NO. 9.—BAYAMON TO RIO LA PLATA.

[Length, 14.3 kilometers.]

This section of road, recently constructed, was turned over to maintenance in April, 1904.

Kilometer No. 1, starting from Comerio street, in Bayamon, was constructed by day labor and paid with funds for maintenance.

The total amount expended has been \$1,139.

ROAD NO. 10.—REYES CATÓLICOS TO COROZAL.

[Length, 17 kilometers.]

During the past year only 200 cubic meters of broken stone has been used out of the 1,520 purchased by contract, shown in Table No. 3.

This stone has been employed in repairing 2,000 square meters of road, consisting in patching up holes with layers of 0.10 meter thickness, at an average price of \$2.48 per cubic meter, or \$1.65 for material and \$0.83 for labor.

Recommendations.—Purchase of 500 cubic meters of broken stone to be used in repairing the metal of the road.

Masonry works.—Old bridge across Rio Lajas at kilometer 2.2. The wing wall on the east side of the abutment on the Toa-Alta side is out of level and separated from the general body of the abutment. It has been necessary to prop this wall with solid pieces of timber to prevent its falling, which undoubtedly would cause material damage to the bridge. The repair of this wall I deem very urgent, and \$600 will put it in a safe condition.

ROAD NO. 11.—SECTION FROM MANATI TO CIALES AND MOROVIS BRANCH.

[Length in maintenance, 19 kilometers.]

During the ending year 1,000 cubic meters of broken stone, purchased by contract, were delivered along this section of road. (Lot 11, Table No. 5.)

Only 200 cubic meters were used in patching, at a cost of \$2.17 per cubic meter, \$1.39 for stone and \$0.78 for labor.

Recommendations.—This section should be supplied with 500 cubic meters of broken stone for repairs to different portions of the road.

Bridges.—There are two important river crossings which lack spanning by proper bridges—Rio Manati, at Mata de Platanos, and Rio Cialitos.

At Mata de Platanos the erection of a bridge 80 meter span is now under way by contract.

At Cialitos the two abutments were built during the military government, only lacking the iron material for a bridge 34 meters span.

Summary of expenditures incurred in the district of San Juan during fiscal year 1903-4.

	Amounts expended.	Average expenditure per kilometer.
Permanent force.....	\$36,198.75	\$131.488
Auxiliary force.....	29,151.97	105.892
Rent of houses.....	1,056.80	3.839
Repairs to road houses.....	1,463.73	5.317
Repairs to bridges and culverts.....	3,249.29	11.803
Broken stone	23,601.10	85.728
Steam rollers	5,627.68	20.442
Carts and ox teams	6,715.34	24.393
Sundries	619.03	2.248
Postage stamps	30.50	.111
Total.....	107,714.14	391.261

NOTE.—The salaries for the regular employees of the steam rollers are not included in the amounts given for our permanent force, but in the item for steam rollers.

With regard to extraordinary services independent of the work of maintenance, I have made during the year several reports and investigations concerning roads and other matters, among which was the investigation made at Vieques by order of Secretary Hartzell relating to a controversy between the municipality and a citizen of that town as to the proper alignment of a house in one of their public streets.

Respectfully submitted.

F. MONTILLA, *District Engineer.*

Mr. P. F. FERNANDEZ,

Assistant Superintendent of Public Works, San Juan, P. R.

APPENDIX C.

REPORT OF THE PONCE DISTRICT ENGINEER.

BUREAU OF PUBLIC WORKS,
Ponce, P. R., July 1, 1904.

SIR: Pursuant to your instructions of May 17, 1904, I have the honor to submit herewith report of operations of the Ponce district for the fiscal year ending June 30, 1904.

The principal work during this period has consisted in the maintenance of finished roads, completion of submersible bridge over Portugues River near Ponce, repairs to bridges over Jaguey River and at kilometer 32 of road No. 4, tests of Guayo River bridge, and the organization of the repairs on road No. 3, Ponce to Guayama.

ORGANIZATION OF PERSONNEL.

Upon my qualification as district engineer of the district of Ponce, September 11, 1903, I found the organization of the work of maintenance needing a few changes in details, which were promptly executed with the best results, as the work has been conducted on a more systematic, economical, and efficient basis.

The district of Ponce comprises a total of 198 kilometers; 37 kilometers of road No. 3, Ponce to Guayama, under repairs, and the balance, 161 kilometers, under maintenance, as follows:

Road No.	Section.	Under maintenance.
1	Cayey to Ponce Playa	Kilometers. 74
4	Cayey to Arroyo	31
6	Ponce to kilometer 34	34
3	Ponce to Guayama (56 kilometers)	19
	Total.....	161

These are subdivided into sections under competent overseers with permanent forces of capataces (foremen) and camineros (sectionmen), excepting the section of second-class road, Ponce to Guayama, which is under the direct charge of 2 capataces and 8 camineros.

These permanent forces have been assisted by a limited number of auxiliary day laborers, carts, ox teams, and two steam rollers, as follows:

TABLE NO. 1.—*Sections under maintenance, district of Ponce, showing permanent forces employed from July 1, 1903, to June 30, 1904.*

Road No.	Section.	Length.	Cami-neros (sec-tion-men).	Capa-taces (fore-men).	Over-seers.	Engine drivers.	Watch-men on steam rollers.	Watch-man at store-house.	Clerk.	District engineer.
<i>Kms.</i>										
1	Kilometers 60 to 70....	10	3	1 {	1	1				
4	Kilometers 0 to 12....	12	4	1 }						
1	Kilometers 70 to 90....	20	7	1						
1	Kilometers 90 to 110....	20	7	1	1	1	1			
1	Kilometers 110 to 130....	20	7	1	1	1				
1	Kilometers 130 to 134....	4	2 {	1	1	1				
6	Kilometers 0 to 21....	21	7 {	1	1	1	1			
6	Kilometers 21 to 34....	13	5	1	1	1				
4	Kilometers 12 to 34....	22	7	1	1	1				
3	Ponce to Guayama	19	8	2						
	Total.....	161	57	10	7	2	2	1	1	1

The total paid to the above-named force for the fiscal year ending June 30, 1904, amounts to \$28,620, subdivided into the two following forces:

INSPECTION AND OFFICE FORCES.

10 capataces, at \$360 per annum	\$3,600
7 overseers, at \$900 per annum	6,300
3 watchmen, at \$360 per annum	1,080
1 clerk, at \$720 per annum	720
1 district engineer, at \$1,800 per annum	1,800

Total 13,500

PERMANENT LABOR FORCES.

57 camineros at \$240 per annum	\$13,680
2 engine drivers at \$720 per annum	1,440

Total 15,120

From the above may be deduced the following averages: One overseer, 23 kilometers, at a cost of \$900, or \$39.13 per kilometer; 1 capataz, 16.10 kilometers, at a cost of \$360, or \$22.36 per kilometer; 1 caminero, 2.824 kilometers, at a cost of \$240, or \$84.97 per kilometer, or an average expense of \$146.48 per kilometer, which when including watchmen, engine drivers, clerk, and district engineer increases to \$177.76 per kilometer.

AUXILIARY FORCES.

The auxiliary day laborers have been employed as conditions required; some camineros have maintained their section satisfactorily for months without help, while others have necessitated from 10 to 15 men during the greater part of the year. This decided difference is principally due to the copious and frequent landslides on roads running through mountainous districts, washouts near streams, and when repairs to macadam or other work of importance were in progress.

This force has required a grand total of \$15,665.57, or an average of \$97.30 per kilometer of road under maintenance.

BROKEN STONE.

A total of 10,090 cubic meters of broken stone and gravel has been acquired during this period, as follows:

TABLE No. 2.—*Broken stone contracted for maintenance and delivered during the fiscal year ending June 30, 1904.*

Road No.	Section.	Contracted.	Delivered.	Price per cubic meter.	Total cost.	Name of contractor.	Lot No. in contract.	Remarks.
		Cu. m.	Cu. m.					
1	Kilometers 71 to 83.....	600	600	\$1.68	\$1,008	Roque Paniagua....	12	
1	Kilometers 86 to 90.....	800	800	1.68	1,344	.....do.....	13	
1	Kilometers 100 to 110....	1,000	1,000	1.58	1,580	Francisco Davila..	14	
1	Kilometers 111 to 112....	600	600	1.70	1,020	Roque Paniagua....	15	
1	Kilometers 124 to 129....	1,200	700	1.39	973	Carlos Clausells....	16	Unable to finish contract.
4	Kilometers 1 to 10.....	800	500	1.92	960	Francisco Fernandez.	17	Part of contract annulled by mutual consent.
4	Kilometers 13 to 20.....	600	300	1.73	519	.....do.....	18	
6	Kilometers 1 to 8.....	600	600	1.50	900	Esteban Ortiz.....	19	
6	Kilometers 22 to 26.....	800	800	1.12	896	Carlos Clausells....	20	
1	Kilometers 128 to 129....	100	100	1.50	150	Manuel Leon .....	.....	Portion of lot 16 to supply part of the deficiency.
	Total.....	7,100	6,000		9,350			

Average cost per cubic meter of broken stone delivered by contract, \$1.558.

Owing to the insufficient amount of broken stone contracted for, it became necessary at times to acquire extra stone and gravel in small lots by administration or day labor, and at places not covered by contracts, in order to supply the most urgent needs. There was a total of 4,090 cubic meters thus acquired, as follows:

TABLE No. 3.—*Broken stone and gravel acquired by administration or day labor during the fiscal year ending June 30, 1904, and amounts left over from previous year.*

Road No.	Section.	Stone acquired by day labor.			Stone from previous year.		Gravel acquired by day labor.		
		Cubic meters.	Cost per cubic meter.	Total cost.	Cubic meters.	Cost per cubic meter.	Cubic meters.	Cost per cubic meter.	Total cost.
1	Kilometers 60 to 70.....	109	\$0.94	\$102.46	197	\$1.90	.....	.....	.....
4	Kilometers 1 to 12.....	109	\$0.94	\$102.46	197	\$1.90	.....	.....	.....
1	Kilometers 70 to 90.....	45	.96	43.20	.....	.....	.....	.....	.....
1	Kilometers 90 to 110....	157	.87	136.59	.....	.....	.....	.....	.....
1	Kilometers 110 to 130....	77	.82	63.07	48	1.65	1,425	\$0.24	\$342.00
1	Kilometers 130 to 134....	842	.98	825.16	187	1.60	.....	.....	.....
6	Kilometers 1 to 21.....	842	.98	825.16	187	1.60	.....	.....	.....
4	Kilometers 12 to 34.....	127	.99	125.73	579	2.00	182	.56	101.92
6	Kilometers 21 to 34.....	145	.93	134.85	.....	.....	981	.32	313.92
3	Ponce to Guayama.....	.....	.....	.....	.....	.....	.....	.....	.....
	Total.....	1,502	.....	1,431.06	1,011	.....	2,588	.....	757.84

Average cost of stone per cubic meter by day labor..... \$0.958

Average cost per cubic meter of stone from previous year..... 1.890

Average cost per cubic meter of gravel by day labor..... .292

NOTE.—The stone acquired by day labor was taken directly from the slopes of road, in places where required, needing very short or no hauls; hence the low average price.

REPAIRS TO MACADAM.

A grand total of 11,101 cubic meters of broken stone and gravel has been used in repairs to macadam. These repairs may be classified into two separate groups; that is, repairs by continuous layers and repairs by separate patches, as follows:

TABLE No. 4.—*Broken stone used in repairs, by continuous layers, and cost of using same, including spreading, sprinkling, rolling, and binder.*

Road No.	Section.	Work done.			Cost.				Per cubic meter, including stone.
		Cubic meters of broken stone used.	Linear meters covered.	Square meters covered.	Per cubic meter of stone used.	Per linear meter.	Per square meter.	Total.	
1	Kilometers 60 to 70	697	1,293	6,465	\$0.71	\$0.38	\$0.08	\$494.87	\$2.49
4	Kilometers 1 to 12	1,249	2,450	12,250	.86	.44	.09	1,074.14	2.52
1	Kilometers 70 to 90	759	1,449	7,245	.85	.45	.09	645.15	2.33
1	Kilometers 90 to 110	1,498	2,558	12,790	.68	.40	.08	1,018.64	2.18
1	Kilometers 110 to 130	340	1,640	8,200	.72	.37	.07	604.80	2.72
6	Kilometers 1 to 21	631	1,192	5,960	.84	.44	.09	530.04	2.44
4	Kilometers 12 to 34	945	1,739	8,695	.80	.44	.09	756.00	1.89
	Total	6,619	12,321	61,605				5,123.64	

Average price per cubic meter..... \$0.774
 Average price per linear meter..... .415
 Average price per square meter..... .083
 Average price per cubic meter, including stone..... 2.264

TABLE No. 5.—*Broken stone and gravel used in repairs, by separate patches, and cost of using same, including spreading, sprinkling, rolling, and binder.*

Road No.	Section.	Broken stone.					Gravel.					
		Work done.		Cost.			Per cubic meter, including stone.	Work done.		Cost.		
		Cubic meters used.	Square meters covered.	Per cubic meter.	Per square meter.	Total.		Cubic meters used.	Square meters covered.	Per cubic meter.	Per square meter.	Total.
1	Kilometers 60 to 70	109	1,312	\$0.97	\$0.08	\$105.73	\$2.75	-----	-----	-----	-----	-----
4	Kilometers 1 to 12	196	1,845	1.20	.13	235.20	2.86	-----	-----	-----	-----	-----
1	Kilometers 70 to 90	398	2,975	1.07	.14	425.86	2.55	-----	-----	-----	-----	-----
1	Kilometers 90 to 110	27	250	1.16	.13	31.32	2.66	1,425	8,750	\$0.23	\$0.037	\$327.75
1	Kilometers 110 to 130	789	6,915	.95	.11	749.55	2.15	-----	-----	-----	-----	-----
6	Kilometers 1 to 21	375	2,780	.74	.10	277.50	2.34	182	1,302	.29	.04	52.78
4	Kilometers 12 to 34	-----	-----	-----	-----	981	4,890	.18	.036	176.58	.50	.50
3	Ponce to Guayana	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
	Total	1,894	16,077	-----	-----	1,825.16	-----	2,588	14,942	-----	-----	557.11

Average price per cubic meter..... \$0.531
 Average price per square meter..... .077
 Average price per cubic meter, including stone and gravel..... 1.742

From all of the above data are deduced the following general averages:

Cost of using 1 cubic meter of broken stone	\$0.676
Cost of same, including price of stone	1.887
Cost of covering 1 linear meter with broken stone .....	.415
Cost of same, including price of stone	1.057
Cost of covering 1 square meter with broken stone .....	.081
Cost of same, including price of stone .....	.226

STEAM ROLLERS.

The work of repairs to macadam has been facilitated to a marked extent by the use of two steam rollers, which have been almost continually at work—one on road No. 1, Cayey to Ponce, and the other on road No. 6, Ponce to Adjuntas. Besides the regular work of rolling the broken stone, these engines have been used to a great advantage to tear up old macadam and reroll same in order to reduce surface imperfections. This has given the most excellent results in those places where the macadam exceeds 10 centimeters in thickness, the cost being very limited for the results obtained.

The following table shows the work done by these two rollers and the cost of operating same:

TABLE No. 6.—*Work executed and results obtained by the two steam road rollers employed in the district of Ponce during the fiscal year ending June 30, 1904.*

	Roller at road No. 1.	Roller at road No. 6.	Total.
Work done:			
Length rolled (continuous layers)	meters..	6,636	4,963
Surface rolled (includes continuous layers, patches, and re-rolling old work)	square meters..	41,680	33,725
Average width (continuous layers)	meters..	5	5
Average thickness	do..	0.102	0.097
Time employed	days..	111	88
Material consumed:			
Broken stone	cubic meters..	3,479	2,574
Coal	tons..	5.59	2.50
Wood	1,000 pieces..	62.45	59.00
Expenses:			
Personnel	\$336.50	\$267.25	\$603.75
Fuel	271.89	157.88	429.77
Grease, oil, waste, etc	35.75	26.93	62.68
Feed water	114.39	27.50	141.89
Repairs	84.00	17.35	101.35
Average cost:			
Per square meter rolled	\$0.020	\$0.015	\$0.0177
Per linear meter rolled .....	.127	.100	.115
Per cubic meter of stone used .....	.242	.193	.221

It is obvious from the above that the depth of macadam does not demonstrate clearly the work done by these steam rollers, which on the other hand is correctly and efficiently shown in the surface rolled.

Owing to the limited time allowed stone contractors to deliver the stone in the different sections, the scattered condition of same, due to the limited quantities allotted, and the urgency of repairs prevented steam rollers from being used to a better advantage, necessitating the employment of ox rollers in order to carry on the work.

I would here recommend that in the future contracts for stone be so arranged that the delivery be made only in those places where steam rollers are at work, and in sufficient quantities to maintain those machines continually busy. This would make steam rollers more efficient, prevent the inconvenient and very often dangerous practice of piling broken stone along the sides of roads for indefinite periods of time, and eliminate the unsatisfactory, slow, and expensive ox roller.

The cost of rolling with ox rollers has averaged \$0.52 per cubic meter and \$0.065 per square meter, a decided disadvantage which favors steam rollers, and not only is the cost to the latter's advantage, but the finished condition of the work is such as to leave no doubts as to the economy and superiority of the steam over the ox rollers.

I would here remark that the expenses in personnel charged to steam rollers only include the actual time at work, but even if the total time of this be included, bringing the average per square meter rolled by steam roller to \$0.038, there would still be a difference of \$0.027 per square meter rolled in favor of the steam rollers.

SUBMERGIBLE BRIDGE OVER PORTUGUES RIVER NEAR PONCE.

At the time of my incumbency in charge of the Ponce district the bridge proper had been finished and accepted by my predecessor, leaving the approaches yet to be terminated. This was satisfactorily done, and the bridge opened to traffic in the latter part of September, 1903.

On the night of the 21st of October, 1903, the bridge was submerged to the depth of 4 feet by an overflow of the river, from which considerable damage resulted. Three piles were undermined and three others shifted from their base, besides a considerable part of the fill on the east approach being washed away. This damage was promptly repaired and further washing by the waters prevented by the construction of stone apron under the east approach.

The total cost of bridge and maintenance expenditures to date are as follows:

Paid to contractor for bridge proper	\$2,263.00
Paid to contractor for approaches	1,525.94
Fencing approaches	232.00
Inspection	230.30
Purchase of land	100.00
Cost of stone apron	137.40

Total expenditure 4,488.64

I must not fail to mention the fact that the east approach to this bridge is threatened with destruction by the constant erosion of waters, and unless prompt action is taken not only the approach will suffer, but the bridge proper may be more or less damaged.

Suitable spur docks or a line of sheet piles should be constructed on the upstream side of this approach, in order to divert the waters and thus prevent further erosion.

The above is a general information of the most important work carried on in the district, and in order to make this more descriptive I will detail each section separately.

ROAD NO. 1.—SECTION KILOMETERS 60 TO 70.

ROAD NO. 4.—SECTION KILOMETERS 0 TO 12.

[Total length, 22 kilometers.]

These two sections are attended by a regular permanent force, consisting of 1 overseer, 2 capataces, and 7 camineros, assisted as well as other sections by a limited number of day laborers and carts.

One of the main expenses in the maintenance has been incurred in the cleaning of ditches, sidewalks, drains, and culverts, for which a total of \$1,940.88 has been expended.

There were 500 cubic meters of broken stone acquired by contract, 109 by day labor and 197 that were left over from previous year.

Of the total, 697 cubic meters were used in repairs to macadam by continuous layers, with which 1,293 linear meters of road were covered to an average depth of 11 centimeters, costing \$0.71 per cubic meter, or \$2.49 including cost of stone.

A surface of 1,312 square meters of repairs by patches was covered by 109 cubic meters of broken stone at an average cost of \$0.97 per cubic meter of stone used, or \$2.75 including cost of stone.

The rolling was exclusively done by ox rollers.

Other work of importance consisted in the removal of 1,569 cubic meters of landslides at an expense of \$0.13 per cubic meter, and the erection of 105 cubic meters of dry masonry parapet and retaining walls costing \$0.95 per cubic meter including material.

These sections are in a fairly good state of maintenance, but the following requirements are recommended:

Broken stone for Kilometers 7, 8, 9, 11, and 12 of road No. 4, and 62, 65, 66, and 68 of road No. 1.

Iron bridges: There are three of these that are in direct need of paint.

Culverts: Although in fair condition, a few minor repairs would be advantageous in order to prevent possible larger expenditure in the future.

Road houses: Should have light repairs and paint.

ROAD NO. 1.—SECTION KILOMETERS 70 TO 90.

[Total length, 20 kilometers.]

The permanent force in this section consists of 1 overseer, 1 capataz, and 7 camineros. These have been assisted in the general maintenance and other repairs by auxiliary day laborers, carts, and one steam roller.

Besides the usual work of maintaining clean the ditches, walks, drains, etc., requiring an expenditure of \$2,009.82, the following has been executed:

A total of 1,445 cubic meters of stone has been furnished—1,400 cubic meters by contractors and 45 by day labor. Of this total, 1,249 cubic meters have been used in

repairs to macadam by continuous layers over a surface of 2,450 linear meters, of an average width of 5 meters, a depth of 10 centimeters and costing \$0.86 per cubic meter, or \$2.52 including broken stone.

In repairs by separate patches, 196 cubic meters of broken stone were used, covering 1,845 square meters, and costing \$1.20 per cubic meter, or \$2.86 including cost of stone. The above repairs were rolled by both steam and ox-rollers.

There were also 1,489 cubic meters of landslides removed at an average expense of \$0.15 per cubic meter, and 50 cubic meters of dry masonry parapet and retaining walls erected costing \$0.86 per cubic meter.

The section is in a fair state of maintenance, but a limited amount of broken stone should be acquired to repair the few minor imperfections in macadam.

The culverts and road houses should also have minor repairs carried out, and the latter painted.

ROAD No. 1.—SECTION KILOMETERS 90 TO 110.

[Total length, 20 kilometers.]

Under a permanent force, consisting of 1 overseer, 1 capataz, and 7 camineros, assisted by the usual limited force of auxiliary day laborers and carts, this section presents a very good state of maintenance.

A total of \$1,375.35, constituting one of the main charges, has been expended in the preservation of ditches, sidewalks, and drains in a clean condition.

Of a total of 1,000 cubic meters of broken stone furnished by contract and 157 by day labor, 759 cubic meters were used in repairs to macadam by continuous layers covering 1,449 linear meters of road surface of an average width of 5 meters, and at an expense of \$0.85 per cubic meter, or \$2.18 when price of broken stone is included.

There were also 398 cubic meters of broken stone used in repairs by patches which covered 2,975 square meters, and cost an average of \$1.07 for labor per cubic meter, or \$2.55 including broken stone.

Other work consisted in the erection of 155 cubic meters of small retaining walls to hold road embankment, which averaged \$0.51 per cubic meter, including material.

In the latter part of October, 1903, the overseer in charge reported floor of bridge over Jaguey River in ruinous condition. The estimated cost of repairs amounting to \$58.75 was promptly approved by the superintendent and work executed in due time.

Four of the floor girders were removed and replaced by new ones, the planking patched, and the abutments slightly repaired. A total of \$45.85 was expended, leaving a balance of \$12.90.

This section requires very little attention for the incoming year; however, a limited amount of stone should be acquired for possible repairs in Kilometers 91 to 93, 94, 96, 97, and 109; culverts may have a few minor repairs made, and road houses slight repairs and paint.

Iron bridge over Descalabrado River requires paint.

ROAD No. 1.—SECTION KILOMETERS 110 TO 130.

[Total length, 20 kilometers.]

The organization of this section consists of 1 overseer, 1 capataz, and 7 camineros, all included in permanent force.

The heavy traffic and the occasional heavy floods of rivers require the constant attention of the personnel, and the incurrence of an unusual expenditure.

As in all other sections, the cleaning of ditches, sidewalks, and culverts has constituted one of the most costly items of expense, requiring a total of \$1,236.28 for its attention.

A total of 1,477 cubic meters of broken stone has been acquired in this section—1,400 cubic meters by contract, at an average cost of \$1.53 per cubic meter; 77 cubic meters by day-labor, at \$0.82 per cubic meter, besides 1,425 cubic meters of river gravel, at \$0.24 per cubic meter, and 48 cubic meters of broken stone from previous year, at \$1.65 per cubic meter.

Of these totals there have been used in repairs to macadam by continuous layers 1,498 cubic meters, covering 2,558 linear meters of road, 5 meters wide, and of an average depth of 11 centimeters, and costing \$0.68 per cubic meter of stone used, or \$2.18 including average cost of stone.

In the repairs by separate patches 27 cubic meters of broken stone and 1,425 cubic meters of gravel have been used. The former covering 250 square meters and the latter 8,750 square meters of surface, with an average expenditure of \$1.16 per cubic

meter of stone used, or \$2.03 if we include the average cost of stone and gravel. Both steam and ox rollers have been used in the above repairs.

The urgency of retaining walls to protect road against erosion has necessitated the erection of 429 linear meters of dry retaining walls, containing 483 cubic meters, at an expenditure of \$1.18 per cubic meter, including hauling of block stone.

The unusual development of what appeared to be dangerous cracks in the arches of the concrete bridge over Guayo River caused my predecessor, during the latter part of his tenancy in office, to make an official report of the matter. After submitting various propositions and projects to remedy the supposed impending danger to the bridge he decided to demolish the parapets, relieving the bridge of all possible excessive load, and to test the arch that showed the most pronounced cracks. This was satisfactorily done by the general inspector of the bureau, assisted by another competent employee and the undersigned, with the following results:

A crown area of 330 square feet was uniformly loaded to 160 pounds per square foot, resulting in a crown settlement of fifteen sixty-fourths of an inch, springing back to within five sixty-fourths of its original position when load was removed. Cornice on north spandrel pulled away one thirty-second of an inch from its abutment when loaded, but regained its normal when relieved. In order to further prove the stability of the arch some 20 men were made to trot in step and close file across the bridge. A decided vibration of four sixty-fourths of an inch on each side of the normal was noticeable, regaining its original level when at rest.

I would recommend that cement be blown into the cracks of this bridge, and that in place of the original heavy concrete parapet a light iron or bronze railing be erected.

This section of road requires the following work for the ensuing year:

Broken stone for kilometers 114, 117, 119 to 122, and 127 to 130.

Repairs to culverts at kilometers 116.200, 119.100, 121.300, 126.100, and 129.100.

Retaining walls for the protection of road embankment in the proximity of river floods.

Repairs to Guayo River bridge, minor repairs and paint to road houses, and the erection of bridges over Buacaná and Inabón rivers.

ROAD No. 1.—SECTION PONCE TO PLAYA. ROAD No. 6.—SECTION KILOMETERS 0 TO 21.

[Total length, 24 kilometers.]

The permanent personnel in charge of these sections consists of 1 overseer, with 1 capataz and 9 camineros.

The usual routine work of cleaning the side ditches, road, and drains has constituted one of the main charges, costing a total of \$1,600.53.

Other important work has been executed as follows:

There were 600 cubic meters of broken stone acquired by contract, 842 cubic meters by day-labor, and 187 cubic meters left over from the previous year. Of the total, 840 cubic meters were used in repairs to macadam by continuous layers, covering 1,640 linear meters of road surface, of an average width of 5 meters, a depth of 8 centimeters, and a cost of \$0.72 per cubic meter of stone used, or \$2.72 per cubic meter including cost of broken stone.

In repairs by separate patches a total of 789 cubic meters were used which covered 6,915 square meters of surface, and cost \$0.95 per cubic meter of stone used, or \$2.15 including cost of same. One of the steam rollers has done the rolling of these repairs.

The section included in road No. 6 has suffered extensively from landslides, of which 6,169 cubic meters were removed at an expense of \$0.15 per cubic meter.

There are parts of road No. 6 that are still very narrow for the requirements of the heavy traffic, and specially so were kilometers 2 and 3, where the road has been widened to 6 meters for a distance of 1,200 meters, at a cost of \$0.25 per linear meter of road. Auxiliary to this work was the construction of 905 linear meters of retaining walls containing 302 cubic meters, and costing \$1.30 per cubic meter, including cost of block stone.

I would recommend the following work for the next year:

Broken stone for kilometers 132, 133, and 134 of road No. 1, and kilometers 1, 2, 5, 10, 20, and 21 of road No. 6.

Bridges: Repairs and paint to several small iron bridges on road No. 6.

Culverts: The erection of two culverts is made necessary, one at kilometer 0.200, and another at kilometer 3.300, and the repair of some others is urgent.

Road houses: These require slight repairs and, most urgently, paint.

ROAD No. 4.—SECTION KILOMETERS 12 TO 34.

[Total length, 22 kilometers.]

This section, in direct charge of 1 overseer, with 1 capataz and 7 camineros, comprises the subsections kilometer 12 to Guayama, 16 kilometers, and Guayama to Arroyo, 6 kilometers.

Besides the regular maintenance, consisting in the cleaning of ditches, sidewalks, and culverts, etc., and costing a total of \$1,973.19, the following work has been executed:

Repairs to macadam by continuous layers, 631 cubic meters of broken stone used, covering a surface of 1,192 meters in length, with an average width of 5 meters, a depth of 10 centimeters, and costing an average of \$0.84 per cubic meter of stone used, or \$2.44 including cost of stone; rolled with ox rollers.

Repairs to macadam by separate patches, 375 cubic meters of broken stone used, 2,780 square meters of surface covered, and \$0.74 as the average cost per cubic meter of stone used, or \$2.34 including cost of stone; ox rollers used.

Of the above total of stone used, 300 cubic meters were purchased by contract, 579 were left over from previous year, and 127 acquired by day-labor.

There were also used in patching road surface 182 cubic meters of river gravel, averaging \$0.85 per cubic meter, including hauling.

Repair to bridges: Early in August, 1903, the overseer in charge reported wooden floor of iron bridge at kilometer 32 in bad condition and requiring urgent repairs. The estimated amount of \$215.20 was approved and work executed by day-labor. These repairs consisted in replacing several of the floor girders and laying a new plank floor at an actual expense of \$204.96, leaving a balance unexpended of \$10.24.

The section as a whole presents a fair condition of maintenance, but the following are urgent requirements: Broken stone for kilometers 13, 14, 16, 19, 20, and 30; paint to iron bridges at kilometers 25 and 32, respectively; repairs and paint to road houses, and minor repairs to culverts.

ROAD No. 6.—SECTION KILOMETERS 21 TO 34.

[Total length, 13 kilometers.]

The permanent force in charge of this section consists of 1 overseer, 1 capataz, and 5 camineros, assisted by a limited number of day-laborers.

The cleaning of side ditches, road surface, and walks has required an expenditure of \$749.24, constituting one of the most expensive charges.

The narrowness of this road and its many curves over dangerous precipices necessitated the widening of road fill in the narrowest parts and the erection of dry parapet walls to protect traffic.

The contractor furnished 800 cubic meters of broken stone, and a total of 145 cubic meters were acquired by day-labor.

These 945 cubic meters were used in repairs to macadam by continuous layers, covering 1,739 linear meters of road and costing an average of \$0.80 per cubic meter, or \$1.89 including price of stone. The rolling was done with steam roller.

A total of 273 linear meters of road was widened to 6 meters, at an average cost of \$0.28 per linear meter, and 626 cubic meters of dry masonry parapet walls erected, costing \$0.98 per cubic meter including the material used.

With the exception of macadam, which needs broken stone for repairs to kilometers 25 to 29, the section is in a fair condition of maintenance.

A few culverts should be lengthened in order to give more width to roadbed.

I specially recommend that the line of this road for a length of 800 meters near the town of Adjuntas be changed in order to avoid the two river fords, which at present constitute a great inconvenience to the traffic and at the same time require an extra expenditure to repair damages caused by the frequent floods of rivers.

ROAD No. 3.—PONCE TO GUAYAMA.

[Total length, 56 kilometers; under maintenance, 19 kilometers.]

After the partial repairs to this road, suspended at the beginning of this fiscal year, a permanent force consisting of 2 capataces and 8 camineros were appointed to maintain the finished portions. These were at times assisted by a very limited number of day-laborers and carts; the principal work consisted in the cleaning of ditches,

repairs to macadam, the filling of mud holes, refilling road embankment, and opening drains in the unfinished portions.

A total of 981 cubic meters of river gravel were used in repairs to macadam and in filling mud holes, covering a surface of 4,890 square meters, and costing \$0.50 per cubic meter, including hauling of gravel.

A total length of 4,397 linear meters of old road was ditched and reembanked at an expense of \$0.24 per linear meter.

The finished portions have been maintained in fair condition, and the whole road always transitable.

REPAIRS UNDER APPROPRIATION.

Under an appropriation of \$20,000 from the trust fund repairs to the above road were begun on the 25th of April, 1904, at kilometers 24 and 42, respectively, advancing without any serious interruption and bidding to become quite efficient.

These repairs consist mainly in the opening of drains, raising road grade, spreading gravel for macadam, and erecting small wooden culverts. The work of grading is accomplished generally by using the material excavated from the side ditches, and, where this is not sufficient, from the sides of road; thus very little transportation of material is necessary.

The introduction of two road scrapers on these repairs has facilitated the work of excavation and fills in certain localities where the soil is adaptable for their employ, but they have failed in general to give satisfactory results. Their failure is due principally to the hardness of soil, which generally is filled with layers of old gravel macadam, river bowlders, stumps of old trees, and other obstructions that continually endanger the stability of the machines and cause the waste of valuable time on the part of these while waiting for obstructions to be removed by the aid of picks, or in changing from one piece of road to another while these are being removed.

As the present appropriation will not suffice to finish all the repairs necessary to this road, I would recommend that another and sufficient amount be appropriated for their termination, and that all the finished parts be placed under maintenance in order to prevent their probable deterioration.

Although the construction of bridges would be most advantageous, I would not recommend these for the present, nor while other needed improvements to road proper, that are more urgent, remain unattended for lack of funds.

The following table shows the amount of work done on the repairs of this road and the cost of same:

TABLE No. 7.—*Repairs to road No. 3, Ponce to Guayama, from April 25 to June 30, 1904, including cost of same.*

Class of work.	Work done.		Cost.		
	Linear meters.	Cubic meters.	Per linear meter.	Per cubic meter.	Total.
Fills, embankments, and side ditches.....	5,139	15,924	\$0.359	\$0.116	\$1,845.84
Lateral drains.....	807	405	.175	.348	141.25
Macadam, including gravel and binder.....	3,190	2,229	.815	1.12	2,600.45
Rolling.....	500	.....	.095	.....	47.50
Construction and repair of wooden culverts.....	.....	.....	.....	.....	136.70
Transportation and repair of tools.....	.....	.....	.....	.....	114.58
Purchase of material.....	.....	.....	.....	.....	67.43
Inspection.....	.....	.....	.....	.....	1,382.03
Traveling expenses.....	.....	.....	.....	.....	83.01
Rent of office.....	.....	.....	.....	.....	20.00
Total expended to June 30, 1904.....	.....	.....	.....	.....	6,438.79
Average per kilometer.....	.....	.....	.....	.....	2,018.63

TABLE No. 8.—*Work done by the two road scrapers on the repairs of Ponce-Guayama road from April 25 to June 30, 1904 (included in Table No. 7, under "Fills, embankments, and side ditches")*.

Section.	Class of work.	Work done.		Cost.	
		Linear meters.	Cubic meters.	Per linear meter.	Per cubic meter.
Kilometer 27	Ditches and embankments	836	1,667	\$0.25	\$0.12
Kilometer 28	do	40	72	.47	.26
Kilometer 29	do	506	707	.19	.14
Kilometer 30	do	570	855	.16	.11
Average and total		1,952	3,301	.21	.13
					411.53

RECAPITULATION.

The grand total expended in the district of Ponce for the fiscal year ending on June 30, 1904, amounts to \$55,805.46, giving an average of \$346.61 per kilometer for the time stated.

TABLE No. 8.—*Budget items of expenditures in the Ponce district during the fiscal year ending June 30, 1904.*

Budget items.	Road number and section.								Expenditures per kilometer.
	Road Nos. 1 and 4, kilometers 60-70, 1-12.	Road No. 1, kilometers 70-90.	Road No. 1, kilometers 90-110.	Road No. 1, kilometers 110-130.	No. 1, Ponce-Playa; No. 6, kilometers 1-21.	Road No. 4, kilometers 12-34.	Road No. 6, kilometers 21-34.	Road No. 3, kilometers 1-56.	
Overseers.....	\$900.00	\$900.00	\$900.00	\$900.00	\$900.00	\$900.00	\$900.00	.....	\$6,300.00 \$39.13
Capataces	720.00	360.00	360.00	360.00	360.00	360.00	360.00	\$720.00	3,600.00 22.36
Camineros	1,680.00	1,680.00	1,680.00	1,680.00	1,680.00	1,680.00	1,680.00	1,920.00	13,680.00 84.97
Laborers	1,733.98	1,880.93	1,345.51	2,409.35	2,885.07	1,878.43	1,496.64	1,922.74	15,665.57 97.30
Rent of houses	60.00	.....	.....	.....	133.00	.....	26.19	.....	219.19 1.36
Bridges, culverts, etc.	45.85	.....	.....	204.96	.....	.....	.....	.....	250.81 1.55
Broken stone (contracts)	960.00	2,352.00	1,580.00	2,143.00	900.00	519.00	896.00	.....	9,350.00 58.08
Steam rollers, salaries .....	.....	1,080.00	.....	540.00	.....	540.00	.....	.....	2,160.00 13.41
Steam rollers, repairs and material	502.03	.....	96.56	.....	96.56	.....	.....	.....	695.15 4.31
Carts and ox teams	378.25	582.26	474.12	701.75	300.00	596.75	16.00	359.75	\$2.90 3,411.78 21.19
Postage, etc	4.00	3.60	5.00	.80	.....	4.20	1.00	2.90	..... 21.50 .13
Tools and material	92.19	27.25	23.07	69.95	155.85	.....	17.80	65.35	451.46 2.80
Total per section	6,528.42	8,313.39	6,940.89	8,792.20	8,297.48	6,276.34	5,506.19	4,969.38	181.17 55,805.46 346.61
Average per kilometer	296.75	415.67	347.04	439.61	331.90	285.28	423.55	261.54	.....

Respectfully submitted.

J. C. BESOSA, *District Engineer.*The SUPERINTENDENT OF PUBLIC WORKS,
San Juan, P. R.

64 REPORT OF COMMISSIONER OF INTERIOR FOR PORTO RICO.

APPENDIX D.

REPORT OF THE MAYAGUEZ DISTRICT ENGINEER.

BUREAU OF PUBLIC WORKS,
Mayaguez, P. R., June 1, 1904.

SIR: In compliance with your request of date May 17, 1904, inviting me to submit a report covering all work done on the sections of the Mayaguez district, I have the honor to submit to you the following:

MAINTENANCE OF ROADS.

Number, section, and kilometers of road maintained during the year 1903-4.

Road No.	Section.	Distance maintained.
2	Mayaguez to Anasco River.....	Kilometers. 9.20
3	Mayaguez to San German.....	20.00
3	Sabana Grande to Yauco.....	10.00
8	Aguadilla to San Sebastian.....	23.70
8	San Sebastian to Lares.....	10.00
14	Consumo to Las Marias.....	9.00
	Total.....	81.90

Number of kilometers, permanent force employed, and expenses of same during the year 1903-4.

Length..... kilometers.. 81.90
Cost per kilometer..... \$176

	Number.	Salaries.
Camineros.....	22	\$5,160
Capataces.....	6	1,920
Sobrestantes.....	3	2,700
Watchmen.....	2	720
Engine drivers.....	2	1,440
Clerk	1	720
District engineer.....	1	1,800
Total.....		14,460

The total of expenses during the year on auxiliary labor amounted to \$4,892.69, or an average of \$59.66 per kilometer.

Yearly expenses for house rent amounted to \$156, or an average of \$1.90 per kilometer.

The expenses for broken stone, hire of carts, steam rollers, etc., have been \$10,132.06, or an average yearly expenditure of \$123.56 per kilometer.

In repairs of bridges, culverts, etc., an expenditure of \$577.02 was made during the year, giving an average of \$7 per kilometer.

Synopsis of expenditures per kilometer during the year 1903-4.

Salaries, field force:

Permanent force	\$176.00
Auxiliaries.....	59.66
House rent.....	1.90
Repairs to bridges, culverts, etc.....	7.00
Broken stone, hire of carts, steam rollers, etc	123.56

Total per kilometer..... 368.12

The following table shows the amounts of broken stone purchased during the year and its cost:

Road No.	Section.	Cubic meters.	Contractor.	Cost per cubic meter.	Cost of placing 1 cubic meter.	Total cost of 1 cubic meter, placed.
2	Mayaguez to Añasco.....	800	S. Castillo	\$1.65	\$0.47	\$2.12
3	Mayaguez to San German.....	1,500	do	1.95	.45	2.40
8	Aguadilla to San Sebastian	1,500	J. Calvente.....	1.75	.63	2.38

Total amount of stone purchased during the year, 3,800 cubic meters.

Cost of the stone.....	\$6,870.00
For placing.....	2,015.75

Total cost.....	8,885.75
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Therefore we find an average of \$2.34 per cubic meter of stone placed.

ROAD NO. 2.—SECTION MAYAGUEZ TO AÑASCO RIVER.

[Length, 9 kilometers.]

Expenses on this section during the year 1903-4.

Salaries, field force:	
Permanent force	\$1,170.00
Auxiliaries	770.01
Repairs to bridges, culverts, road houses, etc.....	331.56
Broken stone, hire of carts, steam rollers, etc.....	1,833.60
Total	4,105.17

The cost of maintaining 1 kilometer was \$456.

This section, one of the most picturesque of the island, is at present in a fine condition.

During the year many improvements have taken place, as the remetaling of 3,000 linear meters, where a layer of 10 centimeters thick of broken stone was spread and rolled with steam road roller.

The amount of stone purchased was 800 cubic meters, at a contract price of \$1.65 per cubic meter.

The amount expended in remetaling the 800 cubic meters of stone was \$375.33, giving an average cost of \$0.47 per cubic meter of stone placed and rolled, or a total cost of \$2.12, including the cost of the stone.

The bridge called "Yaguez" was painted at a total cost of \$95, and 14 masonry culverts were repaired at a cost of \$331.56.

The most important needs of this section are 1,000 cubic meters of broken stone for remetaling and patching, especially at kilometers 5, 6, 7, and 8; culverts, repairs of 6 wooden culverts, the construction of 2 concrete pipes 0.78 millimeter in diameter, and the repairs of 2 caminero houses.

ROAD NO. 3.—SECTION MAYAGUEZ TO SAN GERMAN.

[Length, 20 kilometers.]

Expenses on this section during the year 1903-4.

Salaries, field force:	
Permanent force	\$2,700.00
Auxiliaries	1,377.36
Repairs to bridges, culverts, road houses, etc.....	167.22
Broken stone, hire of carts, steam rollers, etc.....	3,783.85
Total	8,028.43

Average cost per kilometer per year, \$401.

Besides the improvements made last year on this section, there were many others to be done, of which some have been carried out and others are still in progress.

This section is considered as the most important one of this district, on account of the heavy traffic, which always destroys and wears out the macadam.

The permanent force in charge of this road are always kept busy, not only in cleaning ditches, culverts, etc., but in opening drains on both sides of the road in order to avoid the waters being detained in side ditches. This kind of work they are compelled to do very often.

The macadam has been repaired at different places, for which 1,500 cubic meters of broken stone were purchased at contract price of \$1.95 per cubic meter. This amount of stone was spread and rolled on places needed from kilometers 1 to 14. The length of road remetaled has been 6,300 meters, with a width of 4.50 meters and a thickness varying from 0.05 to 0.10 meters.

The spreading and rolling (by steam road roller) of 1,500 cubic meters of broken stone cost \$685.42, making \$0.456 the price per cubic meter.

The cost of 1 cubic meter of stone after being placed was \$2.40.

Three culverts have been repaired on this section at a total cost of \$167.22. The work consisted in placing new floors and repairs of walls.

Part of this section from Pezuela bridge toward San German is now being repaired, especially the macadam. An allotment of \$6,500 was made out of the "trust fund" for the repairs.

The most important needs of the section from Mayaguez to San German are as follows:

Two thousand cubic meters of broken stone for remetaling from kilometer 8 to kilometer 14.

Repairs of the bridge "Mirasol," at kilometer 10, as it is at present in bad shape, and the repairing of 16 masonry culverts; also the repairing of the 2 caminero houses.

ROAD No. 3.—SECTION YAUCO TO SABANA GRANDE.

[Length, 16.70 kilometers.]

Expenses on this section during the year 1903-4.

Salaries, field force:

Permanent force	\$748.69
Auxiliaries	445.64
House rent	36.00
Broken stone, steam rollers, hire of carts, etc.....	25.36
Total	1,255.69

Average price of 10 kilometers maintained from September 1, 1903, to July 1, 1904, \$125.56.

Last September I was ordered to take charge of the two portions of road completed, which were 6 kilometers at Sabana Grande and 4 kilometers on the Yauco side. One capataz and three camineros were named in charge of these two sections.

The only work accomplished on these sections has been the cleaning and repairing of ditches and sidewalks and the refilling of ruts and patches.

There are still two kilometers to be constructed before this section is entirely completed. I take this opportunity to respectfully recommend that an allotment of \$3,000 be assigned in order to finish this section.

ROAD No. 8.—SECTION AGUADILLA TO SAN SEBASTIAN.

[Length, 23.70 kilometers.]

Salaries, field force:

Permanent force	\$3,540.00
Auxiliaries	1,200.58
House rent	96.00
Repairs to bridges, culverts, road houses, etc.....	68.24
Broken stone, hire of carts, steam rollers, etc.....	4,246.05
Total	9,150.87

Average cost per kilometer per year, \$398.

This section of road is at present the only one of this district needing all kinds of improvements. In each one of my monthly reports for this fiscal year I have stated the bad condition of the road. For this section 1,500 cubic meters of broken stone have been purchased at a contract price of \$1.75 per cubic meter. This quantity of stone was used in remetaling 3,245 linear meters of road, which work has cost \$955, or an average of \$0.63 for placing and rolling 1 cubic meter. The total cost of 1 cubic meter of stone placed was \$2.38.

Three wooden bridges were repaired during the year at a cost of \$68.24.

The most important works needed are as follows: The repairing of the macadam, which at many places is all worn out, and for which at least 4,000 cubic meters of broken stone should be purchased.

Bridges and culverts: The construction of bridges at Guatemala and Garcia, the former of 14 meters span and the latter of 8 meters. The repairing of 5 culverts, which work is estimated at \$2,600.

ROAD NO. 8.—SECTION SAN SEBASTIAN TO LARES.

[Length, 14.67 kilometers.]

Expenses on this section during the year 1903-4.

Salaries, field force:

Permanent force	\$302.00
Auxiliaries.....	592.75
Broken stone, steam rollers, hire of carts, etc.....	87.50
<hr/>	
Total	982.25

Average price per kilometer maintained from September 1, 1903, to July 1, 1904, \$98.22.

When this section, 10 kilometers long, was turned over to my charge last September I found it in a very good condition. In charge of the section a capataz was named to direct a gang of 7 men, employed in the removal of landslides, etc. It would give a satisfactory result if all the roads of the island were maintained in the same manner these 10 kilometers have been attended to this year, as already stated in some other part of this report.

The unfinished section of this road is now under construction, but not under my charge.

ROAD NO. 14.—SECTION CONSUMO TO LAS MARIAS.

[Length, 9 kilometers.]

Expenses on this section during the fiscal year 1903-4.

Salaries, field force:

Permanent force	\$1,290.00
Auxiliaries	506.35
House rent	24.00
Repairs to bridges, culverts, and embankments.....	10.00
Broken stone, steam rollers, hire of carts, etc	155.70
<hr/>	
Total	1,986.05

Average price per kilometer per year, \$220.

The condition of this section is as good as it was last year, and this is due to the force in charge, who, as stated in my report of last year, are men who attend thoroughly to their duties.

In the amount expended on permanent force is included half-year salary of the sobrestante, who, besides being in charge of this section, has the supervision of the Mayaguez-Añasco road.

The most important work to be done on this section is the repairing of the embankments at kilometer 6, which, on account of the erosion of the creek running at its foot, are always washed away. The quantity of stone which must be purchased during the next fiscal year is 500 cubic meters.

ROAD NO. 2.—SECTION AGUADILLA TO CAMUY.

[Length, 42 kilometers.]

Last June I was instructed to take charge of this section, but the force employed therein, 2 capataces and 7 camineros, were to be paid from the trust fund.

Up to and including June 1 there have been expended the following:

Capataces and camineros.....	\$2,897.10
House rent	27.66
Painting of bridge at Guajataca.....	90.00
Incidental	183.52
<hr/>	
Total	3,198.28

The unfinished part of this section is now under construction, but not under my charge.

SPECIAL WORKS.

EXPENSES CHARGED TO TRUST FUND.

Besides the inspection of the roads now under maintenance, I have been directed to take charge of all the repair work done and still going on in the sections of roads which form part of the Mayaguez district.

1. *Añasco River bridge*.—This bridge was started some time last September and completed on March 11. On this date, due to a great flood, damages were caused to the bridge, and it was necessary to repair and strengthen the same. A second contract was entered into with the same contractor, and I am pleased to say that the bridge is now completed and open to the public.

Two approaches to the bridge were constructed by day-labor, and consisted of 412 linear meters of new road constructed at a cost of \$1,560.

2. *San German-Lajas road*.—In July, 1903, instructions were given me to proceed to the repairs of the steep ascent back of San German, for which the amount of \$4,500 was allotted. Work commenced in the same month and lasted till September, having expended in the repair of 2 kilometers, including roadbed, ditches, 2 culverts, and macadam, the amount of \$4,031.

At present this section is being maintained by the board of road supervisors, and I am pleased to say that it is kept in good condition.

3. *Mayaguez-Consumo road*.—The repairs of this road were commenced in October last, and up to date there have been expended about \$14,000.

Fifteen concrete pipes were constructed by contract at a total cost of \$1,919.75, and 8 kilometers have been repaired by day-labor. The allotment of \$15,000 for these repairs will be exhausted probably before July of the present year.

The length of this section is 14 kilometers, and there are still to be repaired 6 kilometers, which I have figured to cost about \$8,000. I respectfully recommend that this amount be allotted for the completion of the road.

4. *Yauco-Sabana Grande road*.—The allotment of \$6,000 for the repairs of this section unfinished is now exhausted, having completed 3+100 kilometers of road. There are still to be finished 1,500 kilometers.

5. *Sabana Grande-San German road*.—On April 13, 1904, orders were received to start the repairs of this road, for which an allotment of \$10,000 had been made. Work was commenced the second half of the month of April and is now progressing rapidly. The stone used is being purchased by contract at a price of \$1.10 per cubic meter. By July 1, 1904, 4 kilometers will be repaired, at a cost of about \$5,000.

6. *Consumo-Maricao road*.—This section, a municipal road, is 10 kilometers long and was in very bad condition. Last April orders were issued to begin the repairs, for which an appropriation of \$13,000 had been made.

Work is now in progress, nearly 4 kilometers of roadbed and ditches having been repaired up to June 1.

The stone is being purchased by contract at a price of \$1.10 per cubic meter.

7. *Puente Pezuela-San German*.—This section is a part of road No. 3, from Mayaguez to San German. It was in very bad condition, especially its macadam, for which the amount of \$6,500 was allotted. The stone is being purchased by contract at \$1.80 per cubic meter, and the work is performed by the regular force of maintenance, with help of some auxiliary labor.

8. *Repairs to passenger wharf at port of Mayaguez*.—An estimate was submitted for repairing the wharf, and the amount of \$350 was allotted by the department of docks and harbors. The amount of \$326.64 was expended on the placing of new floor beams, 5 new piles, and painting the wharf.

Respectfully submitted.

R. SKERRETT,
District Engineer.

Mr. P. F. FERNANDEZ,

Acting Superintendent Public Works, San Juan, P. R.

APPENDIX E.

REPORT OF THE SUPERVISOR OF PUBLIC BUILDINGS.

BUREAU OF PUBLIC WORKS, SECTION OF PUBLIC BUILDINGS,
San Juan, P. R., June 20, 1904.

SIR: I have the honor to submit for your consideration the following report of work executed and being carried on by the section of public buildings during the present fiscal year ending June 30, 1904.

The following is a list of buildings at present under control of the bureau of public works:

Executive mansion, San Juan, P. R.: Residence and office of the governor; secretary's office; headquarters of insular police.

Intendencia, San Juan, P. R.: Office of the commissioner of the interior; treasury department; department of education; auditor's office; bureau of insular telegraph; bureau of harbors and docks; bureau of public lands.

Diputación, San Juan, P. R.: Executive council chambers; house of delegates; attorney-general's office; insular library; government printing office; United States post-office.

Audiencia, San Juan, P. R.: Supreme court; district court of San Juan.

Allen street No. 3, San Juan, P. R.: Bureau of public works; consolidated department of health, charities, and corrections; residence of the secretary of Porto Rico.

Allen street No. 5, San Juan, P. R.: United States district court; United States weather bureau; consolidated department of health, charities, and corrections.

Insane asylum, San Juan, P. R.: Insane inmates and residence of the superintendent. The southern wing or end of this building is still occupied by the San Juan High School.

Boys' charity school, Santurce, San Juan, P. R.

Girls' charity school, Santurce, San Juan, P. R.

Insular penitentiary, San Juan, P. R.

Allen street No. 2, San Juan, P. R.: Section No. 1, residence of commissioner of education; section No. 2, residence of the auditor; section No. 3, residence of the attorney-general.

Pabellón de San Juan: Residence of the treasurer.

Red house, Puerta de Tierra, San Juan, P. R.: Residence of the commissioner of the interior.

Insular police barracks, Puerta de Tierra, San Juan, P. R.: Occupied by the insular police as substation of San Juan.

Convalecencia (or governor's summer palace), Rio Piedras, P. R.: Occupied by insular police and telegraph office; also gardens in connection with executive mansion.

Leper colony on Cabras Island, entrance to San Juan harbor: For leper inmates and residence of the attendant in charge.

Public works warehouse, Marina, San Juan, P. R.

Public works storehouse (old army bakery), San Juan, P. R.

Government building, Caguas, P. R.: Occupied by insular police and telegraph office.

Government building, Humacao, P. R.: Occupied by insular telegraph office.

Jail and court building, Ponce, P. R. (old military barracks): Occupied by United States district court; plans being prepared for the installation of the Ponce district court, Ponce district jail, and Ponce municipal court.

Blind asylum (old military hospital), Ponce, P. R.: Plans being prepared for the installation of asylum for the blind in this building.

Public works building, Ponce, P. R.: Occupied by district engineer and insular telegraph office.

Public works building, Mayaguez, P. R.: Occupied by district engineer and insular telegraph office.

Court building, Arecibo, P. R.: Occupied by the Arecibo district court; plans being prepared for the installation of the municipal court and insular police on the first floor.

EXECUTIVE MANSION.

The only repairs of any importance in this building have been the installation of a bath and toilet room with cement floor in the quarters of chief of insular police, the painting of all rooms and offices occupied by the police department, the construction of new plaster ceiling in governor's private bathroom, and the reconstruction of the lower garden. The stable stalls and floor have been rebuilt, and a wood partition was built on ground floor to make an office room for the custodian.

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The large round columns in the courtyard were painted.

At the old summer palace in Rio Piedras a new masonry cesspool was built, a new water-closet put in for the police, the sewer repaired, and minor repairs made to other plumbing. A new line of water pipe was also extended through the garden.

In the public reception room of executive mansion 3 large ceiling lights and 40 incandescent lights were installed; also a complete new installation of wire and lights was made in the police offices.

The other expenditures for labor and building materials have been in the general maintenance and minor repairs of the building and furniture.

The exterior part of the secretary's office is at present being painted.

The total expenditures on repair work for both executive mansion and Rio Piedras summer palace, including the painting work at present being done on the secretary's office, are \$1,846.34.

Total expenditure of repair work and maintenance of both executive mansion and summer palace up to date, \$11,553.77; total amount of appropriation, \$12,500; available balance, \$946.23.

INTENDENCIA.

Painted one large office room in the auditor's office; painted one office room in treasury department.

Built two wood partitions, painted three office rooms, and built new skylight over one office in department of education.

Electric-lighting wire system throughout entire building has been replaced.

More new shelves have been put in for archives of department of the interior.

A complete new drainage system of iron sewer pipe has been laid in the courtyard and connected to city sewer.

Minor repairs to plumbing work and the building in general have been carried on during the year, and the building at present is in excellent condition.

Total amount expended, \$718.97.

DIPUTACION.

General repairs have been made to all broken plaster and doors and shutters throughout the building. One large office room for the attorney-general has been painted, and a new wood screen partition built between two offices in same department; a new sink installed in the printing office; tar-paper roof over frame addition in west-end courtyard repaired and painted.

Electric-light wires throughout entire building have been repaired.

Plumbing system maintained and minor repairs made to the building during the year.

Total expenditure, including contract for painting entire exterior and the two courtyards, which is at present being done, \$1,423.91.

AUDIENCIA.

The only work done in this building has been slight repairs to plumbing and cleaning out sewer system; repairs to leaks in roof and slight repairs to doors and shutters; one new water meter installed; a new line of iron sewer pipe from the building to street sewer is at present under construction.

Total expenditure, including estimated cost of new sewer connection, \$154.02.

ALLEN STREET NO. 3.

On account of the United States Federal court taking possession of more space on the second floor of this building, it was necessary to make considerable alterations in the court department and the secretary's residence, which adjoins the same.

The secretary's bath and toilet room was moved from the space turned over to the court, and new partitions were built and fixtures reset in another location. A new water-closet and wash basin was put in for use of the court.

A new bath and toilet room with cement floor was put in the front part of secretary's residence, and all bedchambers and kitchen of the secretary's residence have been whitewashed and painted.

Considerable repairs have been made to leaks in the roof and many minor repairs made to building throughout.

The garden in the rear has been entirely rebuilt and fixed up; the blue-printing room of the public works has been repaired and painted.

The offices of the consolidated department have been repaired, new screen doors put in, new wood floor laid in one room, and all offices painted.

Total expenditure, \$1,570.34.

ALLEN STREET NO. 5.

Three offices in the board of health have been refloored, and these three offices and two large office rooms of United States district court painted; also built one new wood partition in United States district court building.

The work of changes and alterations heretofore mentioned in Allen street No. 3, in connection with the court, were charged against Allen street No. 5, as the court is properly in this building.

The plumbing and lighting systems have been maintained and minor repairs made to doors, shutters, etc., from time to time.

Total expenditure, \$659.24.

INSANE ASYLUM.

The new plumbing system, which was fully explained in my last annual report, has been completed and is at present in an entirely satisfactory condition.

Besides the work reported in said last report, there has been done the following, payable from "permanent-repairs" fund for the asylum:

New concrete cement floor in the main kitchen; a masonry table with marble top built in kitchen; the new range set up and flue built; also doors and shutters repaired in kitchen and walls and ceiling painted.

In laundry and all toilet rooms new doors were made and new wood partitions built for toilet rooms, all of which have been painted.

A new wood floor has been laid in one office of the superintendent and in the women's dining room; also considerable repairs have been made to old floors in the dormitories.

The main laundry and all toilet and bath rooms have new concrete and cement floors. The lower courtyard in the women's department and the courtyard which lies between laundry and outside entrance has been filled in and concreted. The laundry floor is finished off with cement.

A new cement stair or steps has been constructed, which leads from one of the lower courtyards to upper front yard.

The drain from the hogpen has been laid new with 4-inch iron sewer pipe and connected to main sewer.

The brick wall around the lower women's courtyard was built about 2 feet 6 inches higher.

New floor drains and traps have been put in the 12 cells for women; also new drains and traps placed in the floor of corridor outside of cells.

The vent stacks for these cells have been extended higher above the roof, in order to carry off the odors from same.

Total expenditure from permanent repairs insane asylum, \$9,866.20; from regular fund, \$38.41; total, \$9,904.61.

BOYS' CHARITY SCHOOL.

Four sets of modern slate urinals have been installed in the main toilet rooms for boys.

One arch was cut out in brick wall at one end of boys' dining room, so as to enlarge the room; new cement floor was laid in the new addition thus made; new wood floor was laid in one large class room, and a cement floor laid in room used for water filters.

Sixteen new shower baths have been installed in bathroom for boys.

The drainage system for the main courtyard has been entirely reconstructed, with brick drains and iron grates, and the cement floor repaired.

Kitchen cement floor repaired and new floor drain put in.

One new wash sink installed in courtyard.

General repairs have been made for the maintenance of plumbing and electric lighting systems.

Total expenditure, \$1,334.65.

GIRLS' CHARITY SCHOOL.

No work has been done in this building during the year, except small repairs for the maintenance of plumbing and lighting systems and making a new flue for the kitchen.

Total expenditure, \$106.33.

INSULAR PENITENTIARY.

Complete new wood floors have been laid throughout all the workshops in main building; a concrete and tile floor has been laid in the main entrance hall and inside corridor; all the masonry walls between the workshops in main front building were cut out, thus forming open arches between; 3 new doors were cut in walls; 12 large galvanized ventilators have been installed in roof over main prison dormitory.

Material has been furnished for concrete and cement floors in courtyards and carpenter shop.

New brick-tile roof constructed over the infirmary.

One new water-closet installed for the warden and two for the employees.

Lime and paint has been furnished for whitewashing walls and painting woodwork. Total expenditures, \$1,349.84.

ALLEN STREET NO. 2.

Section No. 1.—Built new wood stair to roof in courtyard; installed new slop sink in kitchen; repaired kitchen range; made slight repairs to floors, doors, and shutters, and calcimined two rooms.

Changed location of water meter from front of building to inside courtyard.

Sections Nos. 2 and 3.—No work done except maintenance of plumbing, lighting, and electric call-bell systems, and slight repairs to doors and shutters.

Total expenditure, \$182.76.

PABELLON DE SAN JUAN.

No work except slight repairs to plumbing and light systems.

Total expenditure, \$9.35.

RED HOUSE.

All interior walls, ceiling, and floors painted two coats.

Roof repaired and new gutters put up; veranda, doors, and shutters repaired; plumbing repaired.

Total expenditure, \$293.01.

INSULAR POLICE BARRACKS, PUERTA DE TIERRA.

Repairs are at present being made to this building; the interior is being whitewashed, all doors, shutters, and the exterior painted, broken plaster on all walls repaired, and general repairs made to doors and shutters; new cement floor is being laid in toilet and bath room, and one water-closet and shower bath installed.

Estimated cost, \$336.20.

LEPER COLONY.

Two new frame cottages have been constructed for the care of suspected cases.

At present the cistern for women's quarters is being cleaned out and repaired, cement floor laid in frame addition, to be used for bathroom, and kitchen range and kitchen repaired.

Total amount estimated, \$355.55.

PUBLIC WORKS WAREHOUSE, MARINA.

For telephone, rent, transporting and hauling materials there has been expended the sum of \$350.03.

PUBLIC WORKS STOREHOUSE.

For cleaning out the premises and repairing gates, locks, etc., there has been expended the sum of \$37.78.

GOVERNMENT BUILDING, CAGUAS, P. R.

Built new wood partitions in the police quarters, put up flag pole, repaired doors and shutters, and cleaned cesspool.

Total expenditure, \$156.86.

GOVERNMENT BUILDING, HUMACAO, P. R.

No repairs have been made during present fiscal year.

JAIL AND COURT BUILDING, PONCE, P. R.

For the installation of the United States district court on second floor, new wood partitions were built to form court room and the necessary offices; three water-closets, two urinals, one wash basin, and one sink put in.

The interior of all court rooms, etc., whitewashed and painted.

Judge's platform and bar railing put up in court room.

Services of watchman and minor repairs to doors.

Total expenditure, \$301.41.

BLIND ASYLUM, PONCE, P. R.

Service of watchman, \$133.70.

PUBLIC WORKS BUILDING, PONCE, P. R.

For repairs of water pipes, \$2.50.

PUBLIC WORKS BUILDING, MAYAGUEZ, P. R.

Repairs to fence, \$16.02.

COURT BUILDING, ARECIBO, P. R.

Work is now in progress for the installation of the municipal court on ground floor; new wood partitions are being put up to form court room and offices; repairs to floor, doors, and shutters; judge's stand and bar railing to be put up; all rooms to be whitewashed and woodwork painted.

Estimated cost, \$325.

PUBLIC WORKS STABLES, SAN JUAN, P. R.

For the feed, shoeing, and maintenance of four horses, repairs on one wagon, one coach, one buggy, two sets double harness, one set single harness, repairs to stables, etc., the total expenditure up to date is \$826.89.

CONTINGENT EXPENSES, PUBLIC BUILDINGS.

For the services of one foreman, at \$75 per month; one teamster, at \$50 per month; one teamster's helper, at \$20 per month; and for the services of a draftsman, at \$100 per month, when needed; and repairs to water meters. The purchase of flags and bunting for all public buildings is paid under this subhead.

Total expenditure to date, including a new supply of flags and bunting, just purchased, \$2,460.04.

ELECTRIC LIGHTING FOR PUBLIC BUILDINGS.

For lighting and current in all public buildings in San Juan and vicinity, total expenditure up to the 31st day of May, 1904, \$4,636.28.

WATER FOR PUBLIC BUILDINGS.

For water consumed in all public buildings in San Juan and vicinity, total expenditure up to May 31, 1904, \$12,433.70.

BUILDING OF CELLS IN INSANE ASYLUM.

For putting in new drains and traps, and beginning the construction of six new cells for women's department the sum of \$67.85 has been expended.

In conclusion I wish to say that plans are nearing completion for the new district jail and the blind asylum at Ponce, to be installed in the buildings which were lately turned over to the insular government by the War Department, also for the construction of a new jail and repairs to the court building at Arecibo.

Also I am at present carrying on the work of renting and repairing buildings throughout the island for the installation of the new municipal courts and two

new district courts. This work is being carried out under instructions from the attorney-general, and the department of justice is paying all expenses connected therewith.

Respectfully submitted.

GUY S. BOYCE,
Overseer of Public Buildings.

Mr. P. F. FERNANDEZ,
Acting Superintendent of Public Works, San Juan, P. R.

APPENDIX F.

REPORT OF THE SURVEYOR AND ARCHITECT.

BUREAU OF PUBLIC WORKS,
San Juan, P. R., June 20, 1904.

SIR: I have the honor to submit herein my report of the works executed by the division under my charge during the fiscal year ending June 30, 1904.

At the beginning of said fiscal year and during the months of July, August, and September works were executed in the field and office for the demarcation and measurement of the public lands located at the barrios of Santa Rosa and Caguana, in the municipality of Utuado. The expenses for said work were paid from funds of the treasury, amounting to \$498.20.

With this end in view, in the last month, June, a triangulation of 38 vertices had been made, with two bases measured directly three times, taking correct bearings for the sides of the triangles in relation to the astronomical meridian of the place, which was obtained by means of repeated quadruple observations of Polaris during three consecutive nights; these observations corrected for declination by data taken from the Nautical Almanac of that year.

As a result of this work the following was accomplished:

First. The demarcation of a piece of land of 1,511.26 cuerdas sold at public auction to private parties.

Second. The discovery and demarcation of another piece of land containing 315.54 cuerdas belonging to the people of Porto Rico.

As the funds appropriated for this purpose were exhausted, the work in the field to determine the total extension of these public lands was stopped.

To make this survey it was necessary to cover a greater area, about 4,600 cuerdas. In such an irregular and broken country, to find a proper site approximately horizontal where to measure the base for comprobation, only 135.42 meters of linear extension could be had at a distance of 7 kilometers apart from the first base. Therefore the triangulation covered a superficial extension of about 50 square kilometers.

As no amount was provided by the legislature in this fiscal year, for office or field work for this division, the undersigned was obliged to carry out that part of the pressing work that he could personally do, giving the plans to be copied to the draftsmen.

In September the making of the project for the Ponce district jail was begun, said jail to be erected on the lot purchased for this purpose by the municipality of that city. When the plans for this jail, to accommodate 500 prisoners, were almost finished, orders were received to suspend work on the same and to proceed to make a project for repairs and improvements to a jail at the Ponce barracks.

Having received superior orders to the effect that the bureau of public works should assist the Porto Rican commission to the St. Louis Purchase Exposition, the superintendent of public works issued an order to the undersigned to suspend his work and place himself at the order of said commission.

In September of last year he did so, having accomplished for said commission the following works:

During the months of November, December, and January a project was made for a building to install all the exhibits from Porto Rico at the World's Fair, which project was approved by the commission at the end of January, and then the undersigned was ordered to proceed to St. Louis, together with the secretary of the same commission, Mr. Pedro J. Besosa, to contract for the erection of the building and to supervise said work, being authorized also, in case any changes or modifications should be found necessary, to propose them to the commission after examining the locality.

On the 2d of February the undersigned left for the United States, and after he had left the commission decided to substitute the intended building with only interior constructions in the agricultural and education buildings of said exposition.

On the 23d of February the projects for those exhibits were sent to Porto Rico, after being approved by the general directors of the St. Louis Exposition, but said

project was not approved by the Porto Rican commission until the end of March, with a number of modifications and suppressions tending to reduce the estimated amount.

Having contracted for the work in St. Louis and executed the staking out of the same, the duties of the undersigned were at an end, and he therefore returned to Porto Rico on the 14th of April last.

During the rest of the year he made a map of the island on a scale of 1:100,000, with statistical data of cultivated areas, means of communication, and amount of trade, which map was sent to St. Louis on the 10th of May to be included in the Porto Rican exhibit.

At the beginning of the present month plans and estimates for the repairs of the building "Cuerpo de Guardia de San Geronimo" were prepared for the purpose of changing same into insular police barracks.

The rest of the present month has been devoted to the work of preparing a topographical map of the island on a scale of 1:50,000, using the documents on file in the archives of the bureau of public works and others belonging to different parties, but of acknowledged correctness.

This work being based on the situation of the trigonometrical bases of the triangulation executed by the Spanish geodetical survey commission, the transformation of the geographical ordinates of those vertices into rectangular ordinates in meters and centimeters was commenced, taking the Washington meridian as the origin of the abcises.

As we have already stated, this will render more easily available the many important data which are to be found at present disseminated, and which have imparted great amounts to the treasury of the island in previous years, and with which a topographical representation of the largest part of the island on a scale of 1:50,000 will be obtained.

I beg to suggest to you the convenience of recommending the appropriation of \$6,000 during two consecutive years for this purpose, this amount to be expended in extending said triangulation from the vertices situated along the coast up to all the interior parts of the island, obtaining by this process the necessary elements to calculate not only the absolute situation of the vertices needed, but also all the visible points constituting natural landmarks in all the municipalities of the island and any data missing to complete the few blank spaces left in the plan on a scale of 1:50,000 which is being made.

Furthermore, this work would give two other advantages of much more importance if it should be ordered that artificial visible marks at long distances be established on those vertices where no natural landmarks could be obtained and publishing the rectangular ordinates obtained by calculation for all the vertices and a detailed description of same for the purpose of compelling the land surveyors who make surveys on the island to refer always to two or more of those vertices and to send copies of the field data to this office.

Those two important advantages would be: First, that the present disorder due to false orientation recorded in the descriptions of boundaries of properties as registered in the office of the registrar of property of this island would disappear, this being due to the fact that surveyors in general take as the north direction the north given by the magnetic meridian, this being also completely undetermined in Porto Rico, not only owing to the variation which takes place during the day and reaches nearly 1° centesimal, but for numberless disturbing causes whose enumeration here would be prolix. Thus a great number of errors and mistakes are made in the descriptions of boundary lines of those estates, and as a final result the office of the registrar of property, which should be the guaranty of the rural property holders, is on the contrary a continuous source of litigation. The second advantage would be that the recording in this office of those private works would furnish the elements necessary to obtain, insensibly and without cost to the treasury of the island, the plans for the taxes on the different properties on a scale of 1:5,000 for each one of the municipalities connected correctly by the triangulations, and said plans could be reduced afterwards to a general one of the island and its adjacent ones in separate sheets on a scale of 1:20,000, obtaining in this way the primary and essential element for the assessment of the tax.

I deem it also my duty to recommend to you the convenience of debarring private parties from occupying and making use of public lands with detriment to the insular treasury, regulating the vigilance to prevent the said abuse, and imposing a penalty on the intruders.

Very respectfully,

ARMANDO MORALES,
Surveyor and Architect.

Mr. PEDRO F. FERNANDEZ,
Acting Superintendent Public Works, San Juan, P. R.

APPENDIX G.

BIDS AND AWARDS.

July 2, 1903.—Bids for the construction of the buildings to be erected at the convict camp.

Only one bid, Juan R. Lous, of Humacao, for \$2,200; rejected.

July 16, 1903.—Bids for the construction of a section of the Arecibo-Ponce road, 4.6 kilometers long, between Tallones and Adjuntas.

Name and address of bidder.	Total cost.
José Roig Colomer, Utuado.....	\$60,626.00
Raoul Marix, Utuado.....	47,577.00
Domingo Rinatti, Ponce	69,370.00
Luis F. Rubio, San Juan	65,629.00
Roque Paniagua, San Juan	71,307.00
W. D. Noble, San Juan.....	71,518.00

The contract was awarded to Raoul Marix for \$47,577, he being the lowest bidder.

August 5, 1903.—Bids for the construction of wing walls and parapets of the Marilla River bridge.

Name and address of bidder.	Total cost.
Benjamin Morales, Mayaguez.....	\$2,618.00
Roque Paniagua, San Juan.....	2,838.00
José Lago, San Juan.....	2,907.50
Andres G. Canton, Naranjito.....	3,498.00
Liborio Sierra, Corozal.....	4,658.00

The board recommends the acceptance of the bid of Roque Paniagua for \$2,838, the next lowest bidder.

August 31, 1903.—Bids for the installation of a plumbing system at the jail in Puerta de Tierra.

Name and address of bidder.	Total cost.
José Castro, San Juan (45 days)	\$1,995.00
Juan Llobet, San Juan (5 weeks).....	1,489.00
J. E. Gordon (2 months)	1,135.00
H. Kaplan (1 month).....	750.00

Contract was awarded to H. Kaplan for \$750.

September 23, 1903.—Bids for the construction of 15 concrete drainpipes and repair of 6 culverts and 6 old drainpipes along the Mayaguez-Consumo road.

Name and address of bidder.	Total cost.
Raoul Marix, San Juan (3 months)	\$4,085.00
Benjamin Morales, Corozal (2 months)	2,850.00
A. Salas, Mayaguez (3 months).....	3,963.00
Roque Paniagua, San Juan (3 months)	3,352.00
Duffaut & Gonzalez, Mayaguez (2 months).....	2,776.00
Victor Honoré, Mayaguez (3 months).....	2,432.50

The contract was awarded to Victor Honoré, of Mayaguez, for the sum of \$2,432.50.

October 13, 1903.—*Bids for furnishing, measuring, and delivering 21,900 cubic meters of broken stone for the maintenance of insular roads in different localities.*

SAN JUAN DISTRICT.

ROAD NO. 1.

Name of bidder.	Price per cubic meter.		
	Kilometers 10-20 (1,600 cubic me- ters).	Kilometers 26-36 (3,000 cubic me- ters).	Kilometers 46-56 (1,000 cubic me- ters).
José Balado.....	\$2.25	\$1.95	.....
Ramon Vila.....	.....	2.20	.....
Guillermo Orrach.....	.....	2.24	.....
Enrique Moreno.....	2.20	2.20	.....
Raoul Marix.....	.....	2.25	.....
Roque Paniagua.....	1.78	1.68	\$1.90
Mullenhof & Körber.....	2.09	2.35	.....
Pedro Larosa.....	.....	1.78	.....

Contract for this section was awarded to Roque Paniagua, of San Juan.

ROAD NO. 2.

[Kilometers 9-17, 500 cubic meters.]

Name of bidder.	Price per cubic meter.
Inocencio Sanchez.....	\$1.80
José Cuesta.....	1.54
Roque Paniagua.....	1.60

Contract was awarded to José Cuesta, of Bayamon.

ROAD NO. 5.

Name of bidder.	Price per cubic meter.		
	Kilometers 1-13 (900 cubic meters).	Kilometers 5-8 (1,000 cubic meters).	Kilometers 22-23 (300 cubic meters).
Julio B. Janer.....	.....	.....	\$1.95
José Balado.....	\$2.00	\$2.10	.....
D. Garofalo.....	2.20	2.15	2.25
Manuel Seoane.....	2.61	1.83	.....
Raoul Marix.....	2.00	1.69	1.95
Juan Perez.....	1.85	.....	.....
Antonio Marquez.....	.....	.....	2.25
Arturo R. Gomez.....	.....	.....	2.95

Three contracts were awarded on this section, as follows: Raoul Marix, kilometers 5 to 8; Juan Perez, of Caguas, kilometers 1 to 13, and Julio B. Janer, of Rio Piedras, kilometers 22 and 23.

ROAD NO. 7.

Name of bidder.	Price per cubic meter.	
	Kilometers 1-11 (1,000 cubic meters).	Kilometers 22-26 (400 cubic meters).
Eduardo Gonzalez.....	.....	\$1.80
José Balado.....	\$2.25	.....
Serafin Soto.....	1.56	1.76
Luis Benitez.....	1.59	1.79
Roque Paniagua.....	1.70	.....

Contract was awarded to Serafin Soto, of Rio Grande, for the whole section.

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Bids for furnishing, measuring, and delivering 21,900 cubic meters of broken stone, etc.—Continued.

SAN JUAN DISTRICT—Continued.

ROAD NO. 10.

[Kilometers 1-16, 200 cubic meters.]

Name of bidder.	Price per cubic meter.
Inocencio Sanchez	\$2.00
José Cuesta.....	1.65
Roque Paniagua.....	1.80

Contract awarded to José Cuesta, of Bayamon.

ROAD NO. 11.

[Kilometers 1-13, 1,000 cubic meters.]

Name of bidder.	Price per cubic meter.
Taboas Hermano:	
Sample A	\$2.53
Sample B	1.65
Raoul Marix	1.39
Mullenhof & Korber.....	2.55

Contract awarded to Raoul Marix, of Utuado.

PONCE DISTRICT.

ROAD NO. 1.

Name of bidder.	Price per cubic meter.				
	Kilometers 71-83 (600 cubic meters).	Kilometers 86-90 (800 cubic meters).	Kilometers 100-110 (1,000 cubic meters).	Kilometers 111-112 (600 cubic meters).	Kilometers 124-129 (1,200 cubic meters).
Esteban Ortiz.....				\$1.75	\$1.75
Francisco Davila			\$1.58	1.58	
R. del Valle	\$1.57	\$1.57	1.57	1.57	1.57
Roque Paniagua.....	1.68	1.68	1.70	1.70	1.80
Carlos Clausells.....			2.40	2.06	1.39

The contract between kilometers 124 and 129 was awarded to Carlos Clausells, of Ponce; the rest to R. del Valle, of Ponce, who declined to accept it, whereupon the board decided to award it to the next lowest bidders, as follows: Francisco Davila, of Juana Diaz, between kilometers 100 and 110, and Roque Paniagua, of San Juan, between kilometers 71 and 83, 86 and 90, 111 and 112.

ROAD NO. 4.

Name of bidder.	Price per cubic meter.	
	Kilometers 1-10 (800 cubic meters).	Kilometers 13-20 (600 cubic meters).
R. del Valle.....	\$1.57	\$1.57
Francisco Fernandez	1.97	1.97

Mr. Del Valle, the lowest bidder, having refused to accept the contract, no action was taken, the price of the other bidder being too high.

Bids for furnishing, measuring, and delivering 21,900 cubic meters of broken stone, etc.—Continued.

PONCE DISTRICT—Continued.

ROAD NO. 6.

Name of bidder.	Kilometers 1-8 (600 cubic meters).	Price per cubic meter.	Kilometers 22-26 (800 cubic meters).
Esteban Ortiz		\$1.50	\$1.50
R. del Valle		1.57	1.57
José Balado			2.12
Raoul Marix		1.75	1.39
Roque Paniagua		1.70	1.54
Carlos Clausells		2.20	1.12

The contract between kilometers 1 and 8 was awarded to Esteban Ortiz, of Ponce, and the one between 22 and 26 to Carlos Clausells, of the same town.

MAYAGUEZ DISTRICT.

ROAD NO. 2.

[Kilometers 0-9, 800 cubic meters.]

Name of bidder.	Price per cubic meter.
Segundo Castillo	\$1.65
Ramon Roman	1.95

Contract awarded to Segundo Castillo, of Mayaguez.

ROAD NO. 3.

[Kilometers 1-19, 1,500 cubic meters.]

Name of bidder.	Price per cubic meter.
Segundo Castillo	\$1.95

Contract awarded to Segundo Castillo.

ROAD NO. 8.

[Kilometers 0-23, 1,500 cubic meters.]

Name of bidder.	Price per cubic meter.
José Lopez	\$1.97
José Calvente	1.75
Mullenhof & Korber	1.99

Contract awarded to José Calvente, of Aguadilla.

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Bids for furnishing, measuring, and delivering 21,900 cubic meters of broken stone, etc.—Continued.

MAYAGUEZ DISTRICT—Continued.

ROAD No. 4.

[Kilometers 0-8, 200 cubic meters.]

Name of bidder.	Price per cubic meter.
Ramon Roman.....	\$2.50

The contract was awarded to Ramon Roman, who declined to accept it.

March 2, 1904.—Bids for the reconstruction of the street along the bulkhead of the San Juan Harbor.

Name and address of bidder.	Labor, per square meter.	Material, per cubic meter.	Both works.
Antonio Higuera, San Juan.....	\$0.18	\$2.25	
Rafael Alvarez Torres, San Juan.....			\$3,200.00
Luis Garofalo.....	.57		
Roque Paniagua, San Juan.....	a \$1,650.00	2.43	3,600.00
Gaspar Vila		3.18	
Miguel Salas		2.32	
Luis Rubio		2.29	2,945.70

a Total cost.

Bids of Antonio Higuera and Luis Garofalo were informal and were not considered. Contract was awarded to Luis F. Rubio, of San Juan, for \$2,945.70.

May 20, 1904.—Bids for the erection, launching, and painting of a steel bridge, 80 meters span, across the Manati River.

Name and address of bidder.	Total cost.
Dooley, Smith & Co., San Juan.....	\$24,498.00
Roque Paniagua, San Juan	15,749.00
Axtmayer & Son, San Juan	28,750.00
L. Ninliatt, Mayaguez	12,770.00
Luis F. Rubio, San Juan	18,171.00
A. Nin Martinez, San Juan.....	15,949.00

The contract was awarded to L. Ninliatt, of Mayaguez, for \$12,770, the amount of his bid.

June 18, 1904.—Bids for the painting of the diputation building.

Name and address of bidder.	Total cost.
Alfonso Cruz, San Juan	\$1,023.00
Axtmayer & Son, San Juan	669.00
A. Nin Martinez, San Juan.....	1,095.00
Guadalupe Flores, San Juan	899.00
Jack Katz, San Juan	1,360.00

The contract was awarded to Axtmayer & Son, of San Juan, for \$669, the amount of their bid.

June 20, 1904.—Bids for the construction of about 4 kilometers of road in the Mayaguez-Las Marias section.

Name and address of bidder.	Total cost.
Adriano Gonzalez, Mayaguez	\$15,569.50
L. Ninliatt, Mayaguez.....	14,892.00
José C. Gonzalez, Mayaguez.....	14,510.50
Victor Honoré, Mayaguez.....	13,224.00
Roque Paniagua, San Juan	14,673.00

The contract was awarded to Victor Honoré, of Mayaguez, for \$13,224, the amount of his bid.

APPENDIX H.

LAWS RELATING TO THE PUBLIC WORKS.

The provisions in section 8 of the Foraker bill, which is the organic act of the island, prescribe that the laws and ordinances of Porto Rico now in force shall continue in full force and effect except as altered, amended, or modified hereinafter or as altered or modified by military orders and decrees in force when this act shall take effect, and so far as the same are not inconsistent or in conflict with the statutory laws of the United States not locally inapplicable or the provisions hereof, until altered, amended, or repealed by the legislative authority hereinafter provided for Porto Rico or by act of Congress of the United States, etc.

The following local laws relating to public works were in force when the military government was established in San Juan October 18, 1898:

General laws of public works, June 22, 1881.

Regulations for the application of the general law of public works, June 27, 1881.

Instructions for public bidding, April 17, 1869.

Contracting of public works, June 11, 1886.

General conditions respecting contracts of public works, June 11, 1886.

Regulations for indemnifications to the technical personnel of public works, November 19, 1879.

The law of waters, April 28, 1886.

Road law, June, 1881.

Law of harbors, February 5, 1886.

Railroad laws, December 9, 1887.

Police law of railroads, February 7, 1888.

Eminent-domain law (Expropiacion forzosa), July, 1884.

Under the military government some general orders having force of law were dictated as follows:

General Order No. 15, February 9, 1899, creating the bureau of public works, engineering, roads and bridges, waterworks, etc.

General Order No. 116, August 12, 1899, creating a board of public works controlling the bureau of public works, to which are assigned the following duties:

(a) Construction, repair, and maintenance of the highways and bridges heretofore styled "military roads."

(b) Construction, repair, and maintenance of country roads and bridges.

(c) Construction, repair, and maintenance of public buildings used for civil purposes.

(d) Improvement and maintenance of harbors and establishment of harbor lines.

(e) Supervision and construction of wharves, docks, and slips.

(f) Construction, repair, and maintenance of light-houses and beacons.

Duties and service of the harbor works discontinued and transferred to the board of public works.

General Order No. 131, August 29, 1899, appointment of Capt. W. V. Judson, Corps of Engineers, U. S. Army, as president of the board of public works.

Circular No. 1, March 10, 1899, directing that competent native Porto Ricans be employed in preference to all foreigners for the construction of the public works.

Circular No. 28, August 19, 1899, establishing the rate of 5 per cent of peso per hour for laborers employed in the public works.

Circular No. 32, September 1, 1899, regulating construction of dwellings in towns in accordance with the Spanish Government circular of June 8, 1893.

General Order No. 56, March 13, 1900; General Order No. 63, March 27, 1900; General Order No. 90, April 28, 1900, authorizing the board of public works, subject to regulations therein, to bring condemnation proceedings for the construction of public works.

General Order No. 102, April 30, 1900, transferring the board of public works to the department of the interior.

General Order No. 103, April 30, 1900, procedure in the matter of franchises and concessions within the island of Porto Rico.

On May 1, 1900, the civil government was inaugurated, and after the legislative bodies were organized under the organic act the following legislation concerning the public works was enacted:

March 1, 1902, an act to provide for the protection and policing of the insular highways of Porto Rico, sections 738 to 749 of Revised Statutes.

March 1, 1902, sections 133 to 137, Chapter VI, Political Code, defining power and duties of the commissioner of the interior.

March 1, 1902, sections 247 to 284, district road law dividing the island into 7 road districts, each under a board of three road supervisors, to take care of the vicinal and rural roads of the island.

March 1, 1902, sections 393 to 427 of the Political Code, creation of the present bureau of public works under the control of the commissioner of the interior; defining duties and powers of the commissioner of the interior and the superintendent of public works in relation to the insular public works, defining same and establishing a number of provisions to take place of the old general law of public works for the island of Porto Rico and the rules and regulations of June 22, 1881, for the extension of said law; both repealed by section 427 of the Political Code.

Under prescriptions of section 426 the commissioner of the interior had to prepare a set of general conditions for the contracting of the insular public works to take place of the articles of general conditions enacted by the Spanish Government June 11, 1886.

These set of general conditions were published both in English and Spanish June 30, 1902, as follows:

DEPARTMENT OF THE INTERIOR OF PORTO RICO,
OFFICE OF THE COMMISSIONER,
San Juan, P. R., June 30, 1902.

In compliance with provisions in section 34 of an act of the legislative assembly of Porto Rico entitled "An act to abolish the board of public works, to provide a new organization for the insular public works, and for other purposes," the following general conditions for the contracting of the insular public works have been issued and shall have after publication the force and effect of law as provided in said act.

W. H. ELLIOTT,
Commissioner of the Interior.

GENERAL CONDITIONS FOR THE CONTRACTING OF INSULAR PUBLIC WORKS.

SECTION 1.—Qualifications of contractors.

American and Porto Rican citizens and foreigners enjoying civil rights in the island, and companies and corporations duly organized and authorized to do business in Porto Rico, may be contractors of the insular public works, provided they can reasonably prove their ability to successfully carry out the works.

SECTION 2.—Proposals.

Proposals for contracting the execution of any public work, or furnishing materials, or for any service relating to public works shall be advertised in general for thirty days. This term may be reduced in urgent cases, but shall never be less than ten days.

SECTION 3.—Advertisement.

The advertisement shall be published in the Official Gazette; by posters affixed in the post-offices and alcaldías of the locality wherein the work or the service is to be performed, and in any other places and manner that the bureau of public works may see fit in order to secure as large a competition as possible from responsible bidders.

SECTION 4.—Contents and form of the advertisement.

The advertisement shall contain concisely:

1. The kind of work or service to be done.
2. Place, date, and hour of opening the bids.
3. The estimated cost of the work or service.
4. The amount of guaranty to accompany the bid.
5. Instructions as to where to obtain blank forms of proposals and all information relating to the work or service to be performed.
6. Reservations of the right to reject any or all bids.
7. Any other peculiar feature as to letting of the work or service in parts or as a whole.

The following form, modified as may be required, shall be used:

"DEPARTMENT OF THE INTERIOR OF PORTO RICO.

"BUREAU OF PUBLIC WORKS.

"OFFICE OF THE SUPERINTENDENT OF PUBLIC WORKS,
"San Juan, P. R., ——, 190—.

"Sealed proposals for the furnishing of all labor and material necessary for the construction of —— (here indicate character of work or service to be contracted ——) estimated in the approved project at (— amount written, and in figures \$—) will be received at this office until (— date and hour —) and then publicly opened.

"All necessary information and blank forms for proposals and instructions to bidders will be furnished on application.

"The right to reject any or all bids is reserved.

"(Signature) _____
"Superintendent of Public Works."

SECTION 5.—*Opening of bids.*

The opening of the bids shall take place in the office designated in the advertisement, before a board of award as provided by law, which board shall award the contract, subject to the approval of the commissioner of the interior.

SECTION 6.—*Instructions to bidders.*

A set of provisions under this head, to form part of the contract, shall be made by the superintendent of public works for each particular contract. These instructions shall contain the following:

Invitation to bidders to visit the place and examine the locality and character of the material encountered, in order to make their own estimates, taking account of all possible contingencies in relation to the work.

Statement of the amount and character of guaranty required to accompany the proposal. If a certified check, to whom it shall be made payable. When and where certified checks, except that of the successful bidder, shall be returned.

Qualifications of guarantors.

Proposals to be made in duplicate.

How the blank forms shall be filled.

Alterations by erasure or interlineation to be explained on margin over the signature of the bidder.

When and where bidders shall submit and how they may withdraw proposals before the time set for the opening of the bids.

No bids to be accepted after that time.

Invitation to bidders to be present at the opening of the bids.

Proposal of the successful bidder to be approved by the commissioner of the interior on the recommendation of the board of award.

Reservation to reject any or all bids.

Term given to the successful bidder to enter into contract after the award.

Amount of security.

Qualifications of sureties.

Price for excavation submitted in the bid to be an average price per cubic meter.

Provision for periodical estimates and payments, whether they shall be monthly or for a shorter or longer period.

Time for completion of the work to be stated in the bid; this is an important factor in the awarding of the contract.

Provision that the contractor will not take advantage of any error or omission in the specifications.

Transfer of contract or part thereof prohibited.

Any particular condition that the superintendent of public works may deem it necessary to specify.

Failing contractors, known as such to the bureau of public works, to be excluded.

SECTION 7.—*Guaranty to accompany proposals.*

The guaranty to accompany the bids specified in the particular conditions for the work advertised shall be not more than 5 per cent nor less than 2 per cent of the estimated value of the work. It shall be given in the form of a certified check made payable to the superintendent of public works, to be forfeited to the people of Porto

Rico if the successful bidder does not fulfill the condition of entering into written contract with the superintendent of public works to begin work within the time specified in the particular conditions of the work awarded, which term shall in no case exceed thirty days.

SECTION 8.—Bond for the good execution of the work.

The bond for the faithful performance of the contract shall be no less than 10 per cent of the estimated cost of the work awarded. It may be given in money or in government or municipal bonds, to be deposited with the treasurer of Porto Rico, or in personal bonds furnished by two responsible sureties, or by a duly incorporated surety company. Each surety must justify in the sum of 10 per cent of the estimated value of the work.

SECTION 9.—Agreement.

The bidder to whom the award is made shall enter into written contract with the superintendent of public works within the time specified in the instructions to bidders. The contract shall be in the form adopted by the bureau of public works, and bidders are to be understood as accepting the terms and conditions contained in said form of contract.

The advertisement, general instructions to bidders, the specifications for the works, and the bonds for the good execution of same shall form part of the contract.

SECTION 10.—Execution of the work.

The contractor shall be furnished all plans and documents required for the construction of the work.

The work shall be executed strictly in accordance with the approved plans which are the basis of the contract and upon the lines given therein and staked out upon the ground in accordance with them by the local engineer in charge.

SECTION 11.—How work shall begin and progress.

The contractor shall begin work within the time specified in the particular conditions of the contract, and shall push the work so as to complete same on or before the date agreed upon for its completion in the contract. The laboring force, ordinary and skilled, and all suitable appliances for the good execution of the work shall be furnished by the contractor in proportion to the extension and nature of the work and the rate of progress required for its completion. In order that the engineer may be sure of compliance with this provision the contractor shall submit to said engineer whenever required a list of such appliances used and of the force employed.

SECTION 12.—Engineer may demand increase of force and appliances.

If at any time before the commencement of the work or during its execution such force and appliances appear to the engineer inadequate to secure either the quality of or the rate of progress required, he may order the contractor to increase the efficiency or improve the character of either or both, and the contractor must conform to such order; but the failure of the engineer to demand such increase of efficiency or improvement shall not relieve the contractor from his obligation to secure the quality of work and the rate of progress established in the contract.

SECTION 13.—Residence of contractor near the work.

From the beginning of the work until its final acceptance after completion the contractor or his authorized representative shall reside near the work and give his personal attention to the faithful prosecution of same. And he shall take care to obtain promptly the official correspondence addressed to him at the post-office nearest to the site of the work, as all notifications so addressed to him shall be valid, and he must give notice in writing to the bureau of public works of any change in his address or that of the person who represents him.

SECTION 14.—Discipline of employees.

In order to secure good and steady progress of the work the contractor shall maintain at all times strict discipline among his men and must employ the necessary skilled workmen. Any employee who shall appear incompetent, unfaithful, or dis-

orderly, or in any other way disqualified for the work intrusted to him, shall be discharged from the work upon the request of the engineer, and he shall not again be employed in the work.

SECTION 15.—Materials extracted from properties of public domain.

Contractors may take and use, free of cost, unless otherwise provided, all materials of the character required for the work which may exist on the lands of public domain, but they are to observe the police regulations in force with reference to said lands, and they shall respect all easement and servitude existing thereon and take all needed precautions not to disturb the free use of said lands. Contractors shall not dispose of materials from quarries not their own property for private use or commercial purposes.

SECTION 16.—Notification to owners of quarries.

When quarries are to be opened on private property the contractor shall notify the owner before commencing any quarrying operations, and he shall indemnify the owners for all damages caused by the quarrying, transportation, or storage of the materials, as well as for the establishment of temporary roads and auxiliary plants, such expenditure being considered as contingent to the work.

SECTION 17.—Origin of materials.

The contractor is at liberty to take the materials from any place he may choose, provided, however, that said materials comply with all conditions required in the specifications. No material shall be employed before being inspected and accepted by the engineer, and all rejected materials shall be removed from the works.

SECTION 18.—Contractor to be responsible for the good execution of the work.

Until the final acceptance of the work is consummated the contractor is solely responsible for the execution of the work contracted for, and if any defective work shall be discovered by the engineer or the agents of the bureau of public works the contractor, after notification by the engineer, shall replace and reconstruct the same at his own expense in accordance with plans and specifications of the contract, and if he refuses to do so the bureau of public works shall have the work done under its direction, the cost and all incidental expenses connected therewith to be paid with money due the contractor, or at the expense of the sureties liable for the good execution of the work.

SECTION 19.—Demolition of work for examination.

Whenever so directed by the engineer the contractor shall demolish any part of the work required for an examination after completion or during the progress of the works under contract. If the work so examined is found to be defective in any respect and not in accordance with the contract and specifications, the contractor shall bear all expenses of such examination and of satisfactorily reconstructing the same as required by the engineer in charge.

If the work so examined is found to have been done in accordance with the specifications, the expense of the examination and reconstruction will be paid to the contractor at the prices named in the contract.

SECTION 20.—Auxiliary works.

Centerings, false works, and all appliances required for the construction shall be furnished by the contractor at his risk and expense unless otherwise specified in the particular conditions of the contract. The contractor, however, shall follow the suggestions made therein and by the engineer for the security of the workmen.

SECTION 21.—Inscription on the works—Articles of antiquity and value are the property of the government.

No inscription shall be put on any parts of the work without proper authorization.

All objects of art, old curiosities and minerals, useful for public education, that may be found in the excavations or along the line of the work, shall be considered as property of the insular government, and the contractor shall take all precautions, as directed by the engineer, for their safe extraction and removal, the expenses to be incurred in such work to be paid by the island.

SECTION 22.—Actual work completed to be paid for.

The contractor shall be paid for the quantities of work actually completed under the approved project, and for such extra work as may be required of him in writing by the engineer, provided said work is completed in accordance with the specifications. The quantities given in the project shall not constitute any basis for any claims except as provided in these conditions or in the particular conditions of the contract.

SECTION 23.—Materials of dimensions not specified used.

If the contractor prefer to use materials of larger dimensions than those specified for the work, and the engineer finds the work acceptable he shall only be paid for the work as called for in the contract. If he uses materials of smaller dimensions, and the work completed is nevertheless accepted, he shall be paid at a proportionally reduced price. Should, however, such work be not found acceptable by the engineer, the contractor shall demolish and reconstruct it in accordance with the specifications at his own expense.

If the increase of dimensions of the materials was ordered in writing by the engineer, the extra cost on account thereof shall be paid to the contractor. In no case, however, shall the contractor use in the work any materials of any other dimensions, weight, or quality than those specified in the contract, unless he has the written authorization of the engineer.

SECTION 24.—Unit prices comprise all operations and wastes.

The cost of all operations required for the completion of the work not specially stated in the particular conditions of the project is supposed to be comprised in the price paid for each unit of completed work.

SECTION 25.—Materials stored near the works.

Seventy-five per cent of the cost of the materials properly stored near the works may be allowed the contractor in the monthly estimates, provided said materials are of the quality and dimensions required in the specifications; but when said material so stored near the work is accepted and estimated, the contractor can not take it away for any other service unless authorized in writing.

SECTION 26.—Use of materials belonging to the government.

If at any time it is thought advisable to use in the work any material belonging to the government, whether new or proceeding from any other source, the contractor may use the same, but he shall be paid only for the labor and transportation of such material.

He shall have no right to compensation for any material not required, unless he can prove that previous to receiving the order he had stored near the works the same amount of material of the quality required in the specifications.

SECTION 27.—Work of drainage not provided for in the contract.

When at any time during the progress of the work it becomes necessary to perform any work of drainage not stipulated in the contract, the contractor shall furnish all the necessary labor for its execution, and such labor and expenses shall be paid for outside of the regular contract. To that effect, the contractor shall submit the pay roll of the force employed, and the payment shall be made in the presence of the engineer or of his authorized agent and shall be the amount of expenses incurred in such works and 15 per cent above and over his disbursements, the latter as compensation for moneys advanced and for supervision of the work.

SECTION 28.—Precautions against accidents.

The contractor shall, during the progress of the work, use all proper precautions for the prevention of accidents to persons and property. He shall put up and maintain such barriers and lights as will effectually prevent any accident in consequence of his work, and he shall be liable for all damages occasioned in any way by his acts or neglect or that of his agents, employees, and workmen.

SECTION 29.—*Use of patented articles or process.*

The contractor shall be solely responsible for the use of any patented article, process, or appliance in connection with the works contracted, as any payment due to patent holders for such use is supposed to be computed in the prices of the bid.

SECTION 30.—*Extra work.*

Any alteration or changes in the project producing work not provided for in the contract shall be considered as extra work.

No claim for extra work shall be allowed unless such work shall have been previously ordered in writing by the local engineer with approval of the superintendent of public works, and an agreement upon the prices to be paid for such extra work has been reached between the engineer and the contractor, and such prices duly approved.

The claims for extra work, when it is ordered, shall be presented and paid in the next monthly estimate for extra work; otherwise said claims shall be forfeited and waived.

Alterations or changes in the details of the work not entailing new prices shall not be considered as extra work, and the contractor will be required to perform such alterations or changes under the direction of the local engineer at the prices named in the contract: *Provided, however,* That said alterations and changes do not increase the quantities over 20 per cent of the original estimate. For all work in excess of 20 per cent of the original quantities caused by such alterations and changes, the bureau of public works reserves the right to enter into a written agreement with the contractor to execute such additional work upon prices mutually agreed upon, or to have the same carried out by day labor or by any other method it may direct. Should, however, any alterations or changes in the work produce a diminution in the original cost or quantities not reaching 20 per cent, the reduction thus made shall not constitute a claim for damages by the contractor or for profits supposed to be lost by him on the work that may be altered or dispensed with.

SECTION 31.—*Claims for losses or damages.*

No claim will be considered on account of losses, damages, or injuries to the work from any cause whatsoever imputable to neglect, incompetency, lack of proper appliances, or bad management: *Provided, however,* That damages sustained on account of "force majeure" and claimed within ten days from date of the event shall be considered, but no claim shall be admitted after said term of ten days.

The following are the only cases esteemed as "force majeure":

1. Fires caused by atmospheric electricity.
2. Damages produced by earthquakes.
3. Damages caused by slides of the land on which work is constructed.
4. Damages caused by armies during war, by popular seditions, and tumultuous robbery.

SECTION 32.—*Discharge of contracts.*

The contract may be annulled by the following reasons:

1. In case of death of the contractor, unless his heirs or legal representatives agree to continue the work under the same contract.
2. If for any cause whatever the government sees fit to suspend the work for a term exceeding three months.
3. If the monthly estimates delivered by the engineer are not paid to the contractor for three consecutive months.
4. For failure of the contractor to comply with the conditions stipulated in the contract.

SECTION 33.—*Discharge with guaranty returned and material stored paid for.*

In the first three cases the work constructed shall be provisionally accepted if complying with the specifications, and after the term of guaranty and the final acceptance the contractor shall have all retained percentage returned and his bond canceled.

When the contract is annulled for the above-stated reasons, the materials stored near the work that have been accepted and the tools and appliances considered necessary for the performance of the work shall be paid to the contractor by agreement or at appraisers' prices.

SECTION 34.—*Guaranty forfeited.*

In the fourth case, when the contract has to be annulled through the fault of the contractor because of delay or failure to commence and execute the work or furnish material as specified under the contract, then the percentage retained and the guaranty deposited shall become forfeited to the people of Porto Rico to the amount of 10 per cent of the original estimate of the works.

After the contract is annulled the contractor has only the right to be paid for the work executed in accordance with the conditions in the contract; but he shall forfeit the 10 per cent of the original estimate of the work required under these regulations as guaranty, which, if not deposited in stock or specie, shall be made good against the bondsmen or guarantors, unless the commissioner of the interior, upon the recommendation of the superintendent of public works, sees fit to grant the contractor a new and final prorogation of the term for the completion of the work, after which term, if the work is not completed, the penalty of 10 per cent shall be enforced.

SECTION 35.—*Partial estimates.*

All measurements and estimates as to quantities and value of the work done by the contractor are to be made by the engineer in charge monthly, unless another term is specified in the particular conditions of the contract and in accordance with the prices stipulated; and upon such estimates certified to by the engineer the contractor shall be paid for the work done during the month or the term specified, less the percentage to be retained under the conditions of the contract.

Estimates for extra work must be separately rendered, citing authority under which it was done.

The prices and rates stipulated in the contract cover every contingency connected with the proper execution and completion of the work in accordance with the specifications.

SECTION 36.—*Partial estimates not final.*

The partial estimates and certificates given by the engineer in charge monthly or at the terms specified in the contract are not to be considered final and conclusive, but subject to corrections when the final liquidation is made, after completion and provisional acceptance of the work contracted.

SECTION 37.—*Delays and extension of time.*

Should the bureau of public works during the progress of the work find it necessary to suspend the work for any time not exceeding three months, or should the work be delayed on account of reasons not within the control of the contractor, an extension of time will be given him for the completion of the contract equal to the time lost by such delays, provided he shall make the application in writing to the superintendent of public works at least thirty days before the expiration of the time specified in the contract, stating fully the reasons of the delays in the work and the time to which he requests the completion of the contract to be extended.

SECTION 38.—*Provisional acceptance.*

After the completion of the work on or before the date specified in the contract, or as extended by the proper authority, and after such completion has been duly certified to by the engineer, the work will be provisionally accepted by the bureau of public works and the final liquidation immediately proceeded with so as to pay the contractor within forty days the balance due him to cover 90 per cent of the amount of the work completed, the remaining 10 per cent to be retained, together with the other percentages previously retained from each partial payment, until the final acceptance of the work.

SECTION 39.—*Final liquidation, special estimate, and measurements.*

After the provisional acceptance, the engineer in charge shall proceed to the final measurements and estimates of the works for the final liquidation, notifying the contractor, who is expected to be present in person or represented by an agent.

His failure to be represented shall not give him any right to claim against said measurements.

The basis for the measurements shall be the plans, profiles, and drawings followed

in the staking out of the work by the engineer and the detailed plans prepared during construction.

If necessary the thickness of the metaling shall be verified by test holes made in such number and at such places in the macadam as the engineer may direct.

SECTION 40.—*Final liquidation examined by contractor.*

The final estimates and liquidations made and certified to by the engineer shall be transmitted to the contractor for his examination, and he must within thirty days submit his observations on said estimates and liquidation, his failing to do so implying a consent to the liquidation as submitted by the engineer.

Any errors found shall be corrected, but no other claims against the measurements and quantities or classification (or the method proposed thereby) shall be considered. The decision of the engineer shall be final and conclusive on that matter if his opinion is indorsed by the superintendent of public works.

SECTION 41.—*Final acceptance—Contract finally discharged.*

The final acceptance of the work shall take place at the expiration of the term of guaranty and maintenance of the work by the contractor, as stipulated in the contract, which term in no case shall be less than four months.

If the work is found completed in accordance with specifications and so certified to by the engineer appointed for the purpose, the final acceptance of the work will be declared by the bureau of public works, and when the final liquidation shall have been approved by the commissioner of the interior the percentages retained shall be paid to the contractor and his bonds canceled, his responsibility under the contract having come to an end. *Provided, however,* That the contractor shall give satisfactory evidence of having settled all claims which may have been brought against him on account of work done or material furnished or for damages to landowners during the progress of the work, before said percentages can be paid and bonds canceled.

SECTION 42.—*General clause.*

The foregoing general conditions shall be applied to all contracts for public works, but may be supplemented by special requirements in particular cases.

San Juan, P. R., —————, 1902.

Approved.

W. H. ELLIOTT, *Commissioner of the Interior.*

APPENDIX I.

BUSINESS METHODS OF THE BUREAU SHOWN IN THE CONSTRUCTION OF A SECTION OF ROAD NEAR LAS MARIAS.

To show how the business of the bureau is conducted under the new legislation we give as a recent example the methods followed to let by contract a piece of road of about 4 kilometers near Las Marias, bids for which were opened June 20, 1904.

An allotment of \$30,000 from the "trust fund" having been authorized for the completion of the Mayaguez-Las Marias road, the survey was started October 1 last to select the best location for the untouched portion of the road at Las Marias end.

The field party surveyed the best three possible locations, and the one presenting the more advantageous features in all respects was selected by the director of the bureau. All necessary data were then taken on the field and the project completed in the office in the form prescribed in section 410 of the Political Code.

After the project was duly approved by the commissioner of the interior, as provided in section 409 of the Political Code, bids were advertised to undertake the work in accordance with the following advertisement, instructions, conditions, and specifications. Bids were duly opened before the board of award and the contract awarded to the lowest bidder, Victor Honore, for \$13,224.

The contract was entered into, with the required sureties, and approved by the commissioner of the interior, as shown in the attached copy herewith, previous to beginning work.

ADVERTISEMENT.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SUPERINTENDENT OF PUBLIC WORKS,
San Juan, P. R., May 24th, 1904.

Sealed proposals in duplicate for the furnishing of all labor and material necessary for the construction of about 4 kilometers of macadamized road in the Mayaguez-Las Marias section will be received at this office until 10 a. m., June 20th, 1904, and then publicly opened.

The cost of the work as estimated in the approved project is under \$20,000.00.

All necessary information, blank forms of proposals, and instructions to bidders will be furnished on application.

The right is reserved to reject any and all bids.

(Signed)

P. F. FERNANDEZ,
Acting Supt. of Public Works.

INSTRUCTIONS TO BIDDERS.

NOTE.—Bidders not conversant with the English language are requested to employ some intelligent person in preparing the subjoined papers and have them properly translated and explained.

Irregularities and informalities which often jeopardize a bid may thus be avoided.

1. The general conditions for the "Contracting of insular public works," issued and printed June 30th, 1902, by authority of the commissioner of the interior, are hereby made a part hereof, except where specially modified by the contract or specifications.

2. Bidders or their authorized agents must visit the place and examine the locality and the character of the material to be encountered, to make their own estimate of the facilities and difficulties attending the work.

3. The guaranty required to accompany the proposal must be in the form of a certified check made payable to the superintendent of public works, and the amount of said check shall be five hundred dollars (\$500.00).

4. Certified checks will be returned after a decision as to the contract has been made by the commissioner of the interior, that of the successful bidder, however, not until the execution of the contract.

5. No proposal will be considered unless accompanied by the required guaranty, and all bidders must satisfy the bureau of public works of their ability to furnish the material and perform the work for which they bid.

6. A firm as such will not be accepted as a surety on a bond for any of its members, nor a partner for a copartner of a firm of which he is a member. Stockholders, who are not officers of a corporation, may be accepted as sureties for such corporation.

7. When the principal, or a surety, is an individual, his signature to a bond shall have affixed to it an adhesive seal. Corporate seals will be affixed by corporations. All signatures to proposals, contracts, and bonds must be written in full, and each signature must be attested by one witness.

8. A proposal by a person who affixes to his signature the word "president," "secretary," "agent," or other designation, without disclosing his principal, is the proposal of an individual. That by a corporation should be signed with the name of the corporation followed by the signature of the "president," "secretary," or other person authorized to bind it in the matter, who must file evidence of his authority to do so. That by a firm should be signed by the firm name, either by a member thereof or by its agent, giving the names of all the members of the firm. Anyone signing the proposal as the agent of another or others must file with it legal evidence of his authority to do so.

9. The place of residence of every bidder and post-office address must be given after his signature.

10. All prices must be written as well as expressed in figures, but written prices shall control where they differ from the figures.

11. A copy of the advertisement, the instructions to bidders, and the specifications, all of which can be obtained at this office on application, must be securely attached to each copy of the proposal and be considered as comprising a part thereof.

12. All blank spaces on the proposal and bond must be filled in, and no change shall be made in the phraseology of the proposal or addition to the items mentioned therein. Any condition, limitations, or provisos attached to proposals will render them informal and may cause their rejection.

13. Alterations or erasures must be explained or noted on the margin opposite and be attested by the signature of the bidder.

14. If a bidder wishes to withdraw his proposal he may do so without prejudice to himself by communicating his purpose in writing or by telegraph to the superintendent of public works not later than one hour before the time fixed for the opening of the bids. His proposal shall then remain unopened and shall be returned to him or his authorized agent.

15. Bids submitted by different members of the same firm or copartnership shall not be considered.

16. Proposals received after the time set for opening the bids will be returned unopened.

17. Proposals must be placed in a sealed envelope, marked "Proposal for the construction of about 4 kilometers of road, between Mayaguez and Las Marias, to be opened 10 a. m., June 20th, 1904," and enclosed in another sealed envelope addressed to the superintendent of public works, San Juan, P. R., but otherwise unmarked. It is suggested that the inner envelope be sealed with sealing wax.

18. The board of award reserves the right to reject any and all bids and to waive any informality in the bids received; also to disregard the bid of any failing bidder or contractor known as such to the insular government.

19. The bidder to whom the award is made will be required to enter into written contract with the superintendent of public works with good and approved security to the amount of fifteen per cent (15%) of the contract price of said work within ten (10) days after notification of the acceptance of his proposal. Should he fail to do so his certified check will become forfeited under the law and the amount will be turned into the treasury of the island.

20. One copy of the bond accompanying the contract must have internal-revenue stamps affixed to the value of one dollar, and if given with a guaranty company as surety, must have affixed, in addition to the one dollar stamp, stamps denoting one-half of one cent on each dollar, or fractional part thereof, paid by the obligor as a premium, and the amount of said premium must be certified to by said guaranty company.

21. The sureties, if individuals, must be residents and property holders of Porto Rico, and are to make and subscribe affidavits of justification on the bond to the contract. Each surety must justify in the full sum and amount of the guaranty and penal sum named in the bond.

22. Bidders are invited to be present at the opening of the bids at the time specified in the advertisement.

23. No bid will be accepted or contract entered into until approved by the commissioner of the interior.

24. Transfers of contracts or of interest in contracts are prohibited by the law and will not be allowed.

25. The contractor will not be allowed to take any advantage of any error or omission in the specifications, as full instructions will always be given should such error or omission be discovered.

26. A copy of the advertisement, the general conditions for the construction of insular public works, general instructions and specifications will be attached to the contract and form a part thereof.

SPECIFICATIONS.

CONDITIONS AND REQUIREMENTS.

27. The contract will be for the entire completion, within five months, of a portion of the Mayaguez-Las Marias road, covering a total length of about four (4) kilometers, and the subsequent maintenance of same for a period of four (4) months.

28. The work will consist of excavating, transporting to any distance, filling, grading, ditching, sloping, and trimming all necessary earthwork; furnishing, placing, and rolling the required quantities of broken stone and screenings for the macadam roadbed; the construction in specified classes of masonry, or brick, or concrete of the necessary bridges and culvert with abutments, and of drains, retaining walls, slope walls, paving, drain pipe, etc., including the erection of false work, scaffolds, forms, cofferdams, or dikes necessary during their construction; and the furnishing of all labor, material, paint, tools, and machinery required for the execution of the whole work; all in conformity with the plans furnished and directions given by the bureau of public works and the specifications herein described in detail and the prices named for each item in the accompanying contract.

29. The quantities stated in the proposal are fairly approximate, but bidders must satisfy themselves by personal examination of the plans and locality of the correctness of the approximate estimate furnished.

30. *Alignments, grades, etc.*—The work shall be strictly executed in accordance with

the original plans, profiles, and cross sections furnished by the bureau of public works, which are hereby made the basis of the contract, and upon the lines given therein and staked out upon the ground in accordance with them by the local engineer in charge.

31. The contractor shall carefully preserve all bench marks and stakes given or set by the local engineer in charge, and in case of his neglecting to do so, will be charged with the expenses of resetting the same.

32. *Extra work.*—No claims for extra work shall be allowed unless as provided under section 30 of the general conditions.

33. No allowance or compensation whatever shall be due or paid the contractor for any temporary roads, bridges, trestles, or any other plant he may erect or use in order to facilitate the work unless as provided in these conditions and in the project.

34. *Delays.*—Nothing herein contained shall be construed into a liability of damages, and in no event shall the contractor claim or have a right to extra compensation or price for damage arising from any suspension or delay in the prosecution of the work from any cause whatever; it being, however, understood and agreed that the contractor shall have such extension of time for the completion of the work embraced in this contract as shall be determined by the bureau of public works and approved by the commissioner of the interior as is equal to the time lost by delays which may have been caused by acts or omissions of the insular government or on account of failure to secure the right of way or from any other reason not within the control of the contractor; provided, he shall give notice of the existence of such delays, detention, or cause of hindrance, in writing, to the bureau of public works within five (5) days after the same shall first occur.

35. *Extension of time to complete contract.*—If by reason of an increase in the amount of work through the occurrence of accidents, strikes, riots, or violence of the elements, or, in general, through acts of force majeure, the progress of the work has been delayed to such an extent that it will be impossible for the contractor to fulfill the condition as to time specified for its completion in this contract, he must make application to the bureau of public works in writing for an extension of time, stating fully the reasons of the delay in the work and the time to which he requests the completion of the contract to be extended. The application is to be made at least thirty (30) days before the expiration of the time specified in the contract.

Should the time for the completion of the contract be extended, all expenses for inspection and superintendence during the period of the extension as allowed by the bureau of public works shall be deducted from payment due or to become due the contractor; provided, however, that if the party of the first part shall, in the exercise of his discretion, because of local or State quarantine restrictions, freshets, or other force or violence of the elements, allow the contractor additional time in writing, as provided for in the form of contract, there shall be no deduction for the expenses for inspection and superintendence for such additional time so allowed; provided further, that such allowance or extension shall in no manner affect the power of the party of the first part to annul the contract adopted.

36. *Payments.*—Payments will be made monthly, from which 10% will be retained until the work is finally accepted at the expiration of the time set for obligatory maintenance.

The nature of this contract is such that the provision in the general conditions for contracting of insular public works for an advance payment of 75% of the value of materials stored and not placed will not be considered and shall not be applied in this case.

37. *Measurements and estimates.*—All measurements and estimates as to quantities and value of the work done will be made by the local engineer in charge in accordance with customary rules of measuring and the amounts, designation, and prices stipulated in the contract, and will be certified to by him on prescribed blank forms for monthly estimates and forwarded to the superintendent of public works as soon as possible after the close of each month.

The contractor or his agent shall be present when the monthly measurements are being made, and he will subscribe his conformity to such measurements, any difference to be settled on the spot or by appeal without delay to the superintendent of public works.

These measurements shall thereafter form the basis for the calculation of all work performed by him under the contract and make remeasurements or new surveys unnecessary after the completion of the work for the final settlement.

However, the monthly estimates rendered will not be considered final until the local engineer in charge has submitted his final report and certificate at the close of the work; such estimates remain, therefore, in the meantime subject to correction, if needed.

38. *Material.*—All materials furnished and used under these specifications must be of the best quality of their respective kind, free from any and all defects which in the opinion of the local engineer in charge would render them unsuitable for the work.

Only the material actually placed and left in the work and accepted shall be paid for, the contractor losing all wastage and retaining possession of all surplus materials left on the completion of the work, the bureau of public works reserving, however, the right to purchase such remaining materials at cost price if it shall deem it advantageous to do so.

39. *Protection of property and traffic.*—The contractor shall construct or restore, at the expense of the bureau of public works and at the rates stipulated in the contract, all private roads, crossings, culverts, drains, ditches, roadways, and approaches that may have been changed, obstructed, or made inaccessible before or after the commencement of the work, and he shall maintain at his own expense a good and sufficient passageway for travel of horses, or for carts, if possible, at each point where the new road traverses any portion of an old road or trail which is temporarily obstructed by the progress of the work.

The bureau of public works agrees, however, to furnish free of cost to the contractor the necessary right of way and such land as may be permanently occupied by the new road and its auxiliary structures.

40. *Settlements of claims and liens.*—The contractor will be required to hold the insular government harmless against all claims for the use of any patented article or process of appliance in connection with the contract herein contemplated, and will be held responsible for the prompt settlement of all claims or liens which may be brought against him on account of work done or material furnished under this contract by any person or persons who have given notice of such claims to the bureau of public works before the final acceptance of the work.

41. *Payment of laborers employed on the work.*—The attention of contractors for public works is called to the law enacted by the last legislature limiting the maximum length of a working day to eight (8) hours for all work paid out of public funds. Said law is in force from March 10th, 1904. Payments for labor and other services rendered under public contracts shall be made by the contractors in the money of the United States or in bank checks of recognized validity, payable on presentation.

42. *Provisional acceptance.*—The provisional acceptance shall take place after the completion of the entire work if the engineer in charge reports that all work has been finished in accordance with the plans and specifications. The superintendent of public works shall notify the contractor in writing of the official acceptance of the work and the date on which same is accepted, after which all provisions under section 38 of the general conditions forming part of this contract shall be complied with.

43. *Obligatory maintenance.*—The term of guarantee and maintenance of the work shall be four months from the date of the provisional acceptance by the bureau of public works.

The road will be opened for traffic after it has been provisionally accepted, and the contractor will be required to maintain it at his own expense for the period mentioned.

He is to restore to grade all settlements in embankments and in the roadbed, and to repair to the original dimensions all damage and cutting of slopes, drains, ditches, and macadam done by rains or running water, and to replace or rebuild all defects in any of the auxiliary works for all or any of which the contractor can be held directly responsible.

The bureau of public works agrees, however, to remove all landslides that may occur during the period of obligatory maintenance; provided, the contractor or his agent has given prompt and immediate notice to the district engineer; the bureau further agrees to pay, at the price named in the contract, for any macadam supplied by the contractor for repairing damages or wear caused to the roadbed on account of traffic in that time.

44. *Final acceptance.*—The final acceptance shall take place at the expiration of the term of guaranty. An inspection will be made of the entire work by an agent of the bureau of public works; and if all works are found in good order and in conformity with every provision and condition of the contract and specifications, the final acceptance will be declared by the bureau of public works and the contract finally closed in accordance with provisions in section 41 of the general conditions.

45. *Cross section of the formation.*—The cross section of the portion already completed of the Mayaguez-Las Marias road shall be adopted for this portion as follows:

For fills or embankments: Width at the height of grade between edges, 5 meters; slopes, $1\frac{1}{2}$ base to 1 height; the width at top may be increased specially in curves when so directed by the engineer in charge.

For side cuts: Width at top or height of grade, 5 meters plus the variable width of the side ditch in accordance with the nature of the ground; the slopes of the cut to be one (1) base to one (1) height for earth, and up to four (4) height for hard ground, according to degree of hardness as the engineer will direct.

For through cuts: The width of five (5) meters between edges of the side ditches will be increased with the variable widths of said side ditches, the slopes to be as specified for side cuts. In each particular case the exact widths will be determined and staked out by the engineer in charge.

The side ditches shall have (0.30) thirty centimeters at the bottom; (0.30) thirty centimeters depth, and the width at the top will vary, in accordance with the slope required by the nature of the ground, from (0.90) centimeters down to (0.45) forty-five centimeters.

46. *Grading to grade line.*--Under this head will be included the making in the rough of all excavations and fills for the roadbed to the heights and points of reference shown on the plans and profiles furnished.

47. *Special grading.*--For ditches, foundations, drains, water courses, cross drains, berms, terraces, shoulders, and box for macadam will be done afterwards, as specifically directed and provided for, and at the respective prices, if any, named in the contract, or at the contract price for excavation.

48. *Excavations.*--All excavations will be measured and paid for by the cubic meter at the price named in the proposal and without classification. The price therefor is to include the clearing and grubbing of the ground of all trees, plants, buildings, fences, loose soil, and other debris to the full width at the base of embankments and wherever required, the cost of removal and transportation of the excavated material to any point and distance designated, and the depositing of the same in embankment, fills, and waste piles, except as otherwise specified herein.

The contractor will be permitted to use rock, gravel, sand, or any other material suitable for his work or works and excavated between the authorized lines of the road without any deduction from the estimates for the value thereof, in return for which he shall deposit, when so ordered by the local engineer, at convenient points along the road, any or all those materials in reasonable amounts for use by the bureau of public works, and at no time can he remove, sell, or store such materials for commercial purposes.

The price paid for excavation in water shall apply only to foundation pits under water and the deepening of channels in running water, regardless of the kind of material excavated, and covers all incidental expenses connected therewith.

Excavation in excess of the cross sections as shown on the original plans or as authorized by the local engineer, as well as slips or subsidences extending beyond the slope lines, shall not be paid for, unless, in the judgment of the engineer such are due to causes which are not the fault of the contractor or his agents. In such cases the surplus material shall be removed and the contractor paid the actual expenses of removal.

If springs of water-bearing strata are encountered in cuts, the contractor shall, at his own expense, make temporary provisions during the progress of the work to carry the water out of the cut and from the roadbed until the regular drainage is provided for.

The total in estimating quantities of all excavations must be rendered in units, reducing or allowing fractions less or more than one-half cubic meter, respectively, to the nearest cubic meter.

Where the quantities of excavation exceed the amounts necessary to make up contiguous embankments to the standard cross section, the surplus material shall be used, if it can be done without detriment to adjoining private property, in widening these embankments on one or both sides, or it shall be deposited at such points as the local engineer in charge may direct, provided the distance it is transported does not exceed three hundred and thirty meters.

49. *Fills and embankments.*--All fills are to be made of suitable material in horizontal layers not more than two feet thick spread across the full width of the embankments and to the true slope. No after filling from the top will be allowed.

If rock is used, no pieces larger than two-tenths of a cubic meter in size shall be placed in embankments which are less than three meters in height; but larger pieces may be used, up to within one-half meter, below grade in fills exceeding that height in the base and at the foot of slopes which are liable to be washed by adjacent water courses; that spaces and voids between the larger stone are filled in by hand with spawls or other fine material, moistened or rammed if necessary.

All fills over bridges, culverts, masonry, or concrete pipe, drains, and walls, and behind abutments and wing walls, shall be made in layers not more than one-tenth meter in thickness, and shall be well rammed and tramped if of earth, and well

packed by hand if of stone. At no time, however, shall these fills be made until the local engineer has decided that these structures are in a proper condition to receive them.

If fills or embankments are to be constructed upon side slopes having a greater inclination than one in five, the contractor will be required to cut steps or terraces not less than one meter wide into the slope for a footing for the material to be deposited upon the same, at such points as the local engineer will direct, the price therefor to be that for excavation.

Proper allowance must be made in constructing embankments or fills for shrinkage due to the character of the material used therein, and for any possible settlement or compression of the subsoil by the superimposed weight. If the latter is boggy, or contains water, stagnant or running, the same provisions must be made by temporary drains before the material is placed thereupon, as described in paragraph 49, for cuts.

Ample time must be given to all fills and embankments to settle and to become consolidated before the macadam is placed thereon.

50. *Slopes* shall be cut, trimmed, and finished according to profiles and stakes given by the local engineer. All loose stone and stumps of trees therein shall be promptly removed, together with all overhanging trees, bushes, and plants growing within a one-meter rayon along the upper edges of the slope. The contractor and his agents will be held responsible, however, for the accidental or intentional disturbance or removal of any of the slope stakes set by the local engineer, and he shall be paid for all expenses resulting from such neglect.

Berms in the slopes shall be cut at such points and of such dimensions as the local engineer may direct, the price therefor to remain the same as that for excavation.

51. *Ditching*, as such, will be paid for by the lineal meter if less than one meter in width across the top and one-half meter in depth. It will embrace the changing and regulating of small water courses at and near the inlet and outlet of culverts and drains, the excavation of material for low embankments from side ditches, and the cutting of all catch-water drains in slopes and along the upper edges of slopes consisting of earth or loose material.

All material excavated from cuts or ditches, when not otherwise disposed of, must be deposited not less than two meters from the edges of cuts and ditches, respectively.

Ditches cut along the upper edges of slopes, when ordered by the engineer in charge, shall be placed no less than one meter from the slope stakes, and must be given sufficient size and grade to drain the adjacent heights properly.

52. *Borrow pits* shall be opened and cross sectioned where the engineer in charge may direct, and the material obtained therefrom will be paid for as excavation. It is presumed, however, that the quantities as shown on the profile are properly balanced for the construction of all fills and embankments without recourse to borrow pits. Should the contractor, therefore, for his own convenience, prefer to obtain the material in a manner different than that specified and authorized, he shall not be allowed to present any claim for excavation thus made.

ROADBED.

53. *Cross section of roadbed*.—After the principal excavation has been done and the bottom of cuts and the top of embankments have reached the grade line, the roadbed will be prepared and finished in the manner shown on the cross section approved for this road, with such modifications as the local engineer has authorized or may have been ordered to make. This embraces the excavation of two ditches along each side of the roadbed proper, in through cuts, and of one ditch on the inner or slope side cuts, all of proper and sufficient dimensions; the excavation of the box to receive the macadam, and the construction of the so-called blanket or sidewalks between the macadam and ditches.

Wherever it is possible, the box for the macadam must be cut out of the natural ground, with the required slopes from center to sides, to obtain for the macadam, as herein specified, the proper crown and slopes.

The bottom of the box shall be compacted and rolled when in soft material before macadam is placed therein, sloping in both directions from the center, as above stated.

54. *Macadam*, after being placed and rolled, shall be not less than fifteen (15) centimeters in thickness, the section having, when finished, a transverse slope in both directions from the center of about four per cent, or one-half inch to one foot. The above dimensions may be increased or reduced with the approval of the superintendent of public works, if good reasons are shown for doing so by the local engineer.

The broken stone used shall be laid in one course, the quality of the stone to be the best obtainable along the road and as approved by the local engineer.

The course shall be no less than 15 centimeters of stone, broken into cubes, from three to five centimeters thick in any direction.

All stone varying more than twenty per cent from the above dimensions in any one direction will be rejected. It is also preferred that the stone be broken by hand.

The stones shall be rolled with a roller weighing not less than four (4) tons until no movement is observable in the mass in front of the roller, the rolling to begin at the sides and to continue towards the center until a satisfactory consolidation has been obtained.

No rolling shall be done until the subbed is thoroughly dry.

55. *Telford pavement and cross drains* shall be laid or provided at all such points where the bottom of the box receiving the macadam is upon wet or clayey soil, and where the local engineer has decided that any one of these supplementary works are necessary.

For telford pavement, blocks of stone not less than twenty centimeters high, ten centimeters thick, and twenty-five centimeters wide shall be set on their broadest edges, firmly and close together, upon the prepared roadbed, the top of the pavement to be on a level with and of the same grade as the bottom of the box for the macadam. Any spaces between the blocks must be filled with spawls and chips, driven in with a rammer or hammer, until all interstices are properly closed and the top presents an even surface.

Cross drains will be cut into the subbed when ordered by the local engineer, and are generally about twenty centimeters wide and about fifteen centimeters deep, leading from near the center of the road in both directions towards and into the side ditches, with sufficient fall for drainage. They are to be filled, before being covered up by the macadam, with broken stone, both excavation and stone to be paid as per prices named in the contract.

56. *Screenings*.—After the course of macadam has been properly rolled and compacted, screenings of the same kind, or of the residue obtained in breaking stone, or of coarse sand or gravel, or of any other material acceptable to the local engineer, shall be used as a top dressing.

The screenings must be placed and rolled in wet weather, or they may be sprinkled or saturated with water whilst being rolled, but not to such an extent that the water will reach the subbed of the macadam. The rolling must be done with a road roller weighing not less than four tons, and must be continued until only small quantities adhere to the wheels of the roller in passing over the screenings.

The quantity of screenings to be spread depends upon the material used for that purpose and upon the kind of stone used for macadam, and may be increased or reduced as the local engineer may decide. The final depth of the dressing after being thoroughly compacted should be about one centimeter.

57. *Measuring macadam and screenings* shall be done before the material is placed on the roadbed, either in well-packed symmetrical piles stored along the road or in gauged and numbered carts, whichever in the judgment of the engineer in charge will be most convenient. The material, before being measured, must be free from all refuse and foreign matter and of the proper size and quality as specified and approved. Only the quantities so measured and accepted will be paid for by the cubic meter at the contract prices.

58. *Side ditches* must vary in width in accordance with local requirements, and will be paid for as specified. Their longitudinal slope will be generally that of the roadbed, unless otherwise directed; but if through loose, soft soil upon a steep grade their bottom and sides may be protected by dry paving or by constructing terraces of flat stones at certain intervals, as may be ordered, this work to be paid for as dry paving.

MASONRY.

59. Cuiverts, bridges, abutments, pipe drains, retaining and slope walls, and similar structures shall be constructed in accordance with the special plans furnished by the bureau of public works. The contract price for each includes complete erection and all incidental expenses connected therewith; also the erection and removal of temporary plant and road crossing, and the clearing of the ground of surplus material and débris.

They will be built, wholly or in part, of masonry and concrete, as shall be directed, and will be paid for as classified and stipulated in the contract, all material therefor to be first inspected and approved by the local engineer before it is used.

60. *First-class masonry* shall consist of coping and other stone, cut and dressed on all sides, and of rock-faced ashlar work laid in regular horizontal courses having

parallel beds and vertical joints and of not less than twenty-one (21) nor more than seventy-six (76) centimeters in thickness, the courses to decrease regularly in thickness from the bottom upward.

61. *Second-class masonry* shall consist of broken range rubble work laid with horizontal beds and vertical joints on the face.

62. *Third-class masonry* shall consist of rustic or rag rubble work dressed to make close joints.

63. *Foundation stones*, if no concrete is used, must not be less than twenty-six (26) centimeters thick, and each stone shall contain not less than nine-tenths (0.9) square meter surface.

64. *Brick masonry* shall be constructed where directed in connection with either concrete or other masonry structures, and shall be paid as brickwork.

65. *Mortar*.—All masonry shall be laid with close-fitting joints, not over one-half centimeter wide and not less than ten centimeters deep at the face, filled and flushed with cement mortar made in the proportion of one part Portland cement to three parts of clean, sharp sand, loose measure, used immediately after being mixed to the proper consistency. About one per cent of lime may be added to the mortar used in third-class masonry, rubble walls and backing, and retaining and slope walls.

Mortar used for pointing face joints must be of the proportion of one cement to two sand.

66. *Rubble backing*, where necessary, will be classified as third-class masonry, and shall consist of stone of good quality and size and shall be laid in such a manner as to form a good bond in every direction, all courses to be thoroughly grouted before the succeeding course is laid, so that no voids are left in the walls.

67. *Work on masonry* of any kind laid in cement mortar shall, when once begun, be carried on with great caution to avoid, by hammering or shocks and blows, the breaking of the work already set or partly set. The local engineer may order the removal of any or all parts of the works so damaged for the purpose of reconstructing it at the contractor's expense.

All unfinished structures shall be well protected against the weather and trespassing during the suspension of actual operations and during the night. Before work is resumed after having been interrupted for more than two (2) hours, the unfinished portion must be wetted and grouted with pure cement mortar to form a good bond with succeeding work.

68. *Retaining and slope walls* shall be constructed in accordance with drawings furnished and at such points as the bureau of public works shall direct. They will be laid dry or in lime or cement mortar, as the engineer may direct, and will in the latter case be classified as third-class masonry and conform in every respect to the specification as given above for that class of work.

69. *Dry walls* shall be laid closely and with care and be of large stone of good quality selected for that purpose. The use of small spalls must be avoided as much as possible, and the foundation must be prepared as directed by the local engineer.

When required by the local engineer, all walls must be backed with small broken stone and provided with suitable outlets for the drainage or seepage, and small water courses behind them.

70. *Sloping and trimming* of all banks and slopes and the digging of foundations and refilling of all excavations necessary for the construction of all slope walls, retaining walls, and dry walls will not be paid for separately, the work to be included in the prices paid for each class of work, respectively.

71. *Riprap* shall consist of stones not less than three hundredths (0.03) of a cubic meter in contents and must be closely laid, the larger stones to be used at the foot of the apron.

72. *Paving for culverts, drains, and ditches* shall be laid dry or grouted, as directed by the engineer, and will be made of stone set on edge and from twenty-one (21) to forty (40) centimeters in depth.

73. *Wheel guards* shall be made of hard, durable stone, selected and approved by the engineer in charge, and shall be cut in accordance with dimensions and sketch furnished by the bureau of public works, the price to include delivery and setting of them at such points as the local engineer will indicate.

CONCRETE WORK.

74. *Concrete* shall be composed of Portland cement, sand, and broken stone or gravel of the qualities and quantities hereinafter specified.

75. *Cement*.—No cement will be allowed to be used except of established brands of high-grade Portland cement which have been made by the same mill and in successful

use under similar climatic conditions to those of the proposed work for at least three years.

Tests and inspection of the cement will be made in accordance with the rules established by the American Society of Civil Engineers, copies of which can be had by applying to this office; and all cement not coming up to these requirements, after having been transported to or stored at the place of the work, shall be rejected and shall be removed at the contractor's expense.

Approval must be obtained from the bureau of public works for the substitution of one brand for another if, for the time being, only insufficient quantities of the authorized brand are available and the progress of the work might be delayed.

76. *Sand* shall be clean and sharp and shall pass a No. 12 sieve. If necessary, the engineer in charge can order it to be washed or screened, or both. If good bank or river sand can not be obtained, the substitution of so-called fine Tosca will be permitted after mortar tests made with the same before it is used in the works have given satisfactory results.

77. *Stone for concrete* shall be of a quality to be approved by the engineer, and of the size called for in each particular case, and must be free of dirt and fine screenings before being used. Good, clean, sharp gravel may be taken in the place of the broken stone, of the proper size and in proportionate quantities to produce the same relative strength in the concrete, when this has been authorized by the bureau of public works.

78. *Mixing concrete*.—The sand and cement shall first be thoroughly mixed dry until of a uniform gray color and shall then be spread out on a mixing platform. Then the stone of larger size, having first been dampened, shall be evenly spread over the mixed sand and cement. Then the stone of smaller size, having first been dampened, shall be evenly spread over the larger stone. The entire mass will then be turned over not less than three (3) times, with the gradual addition of water, until thoroughly mixed and appearing like wet earth. The amount of water to be used shall be all that the concrete will carry without quaking under the rammer.

Concrete shall be turned in low piles and never piled up so that stone will roll down the sides, and the mixing shall continue until satisfactory to the engineer or inspector, who in all cases will decide when it is fit to be placed.

79. *Placing concrete*.—After being prepared, the concrete will be immediately placed in position and thoroughly rammed until it flushes all over the surface. No concrete that has begun to set will be allowed to be placed in the work; retempering will not be allowed. When required, a mortar surface must be worked against the forms while the concrete is being placed and rammed, the plastering to be paid as concrete.

After placing it, all concrete shall be protected from rain for twenty-four (24) hours, and from the direct rays of the sun, by keeping it wet and damp for eight (8) days.

80. *Proportion of mixtures*.—Concrete in exposed walls, or placed in water, shall be mixed in the proportion of one (1) of packed cement, two (2) parts of sand, three (3) parts of thirteen-millimeter stone, and six (6) parts of fifty-one millimeter stone.

Concrete under ground, not exposed and not placed in water, may be mixed in the proportions of one (1) part of packed cement, three (3) parts of sand, $\frac{1}{2}$ parts of thirteen-millimeter stone, and nine (9) parts of fifty-one millimeter stone.

Concrete for arch rings, cornices, mouldings, bridges, seats, etc., shall be mixed in the proportion of one (1) part of packed cement, two (2) parts of sand, two (2) parts of eight-millimeter stone or sharp gravel, and three and one-half ($3\frac{1}{2}$) parts of twenty-five millimeter stone.

81. *Monolithic work*.—Where monolithic work is called for on the plans or by the engineer, every batch must be deposited on the previously deposited batch or batches before the latter have had time to set. If necessary, the work will be carried on continuously (by three eight-hour shifts) to obtain this result.

82. *Exposed surface of concrete*, when not specially required to be plastered, shall be pointed and floated with thin cement grout well rubbed on and made in the proportion of one cement to two of fine, sharp sand, without extra charge.

At any time the engineer is not satisfied with the contractor's method of measurements he may require the measurement to be made in boxes or barrels.

83. *Concrete drainpipe* shall be made monolithic of concrete in accordance with detailed drawings furnished, and in two sizes of eighty and sixty centimeters clear inside diameter, respectively, and will be paid for by the cubic meter. The thickness of the shell and the length of the pipe will vary with the height of the embankments placed over them.

If soft, porous soil, the pipe will be laid upon a bed of concrete twenty-two centimeters thick, or more if necessary, or upon a bed of well-rammed broken stone, paid as such, and of a thickness as may be designated by the local engineer. In hard, dry soil the pipe can be laid or built directly into the bottom of the trench.

Both ends of the pipe shall be chamfered, to conform to the slope of the embankment, or they shall be finished with small concrete or masonry face walls, as the engineer may direct, and to be paid as such, respectively, and to be built of the dimensions as shown on the drawings.

The concrete used in pipes shall be mixed in the proportion of one part packed cement, two parts of clean, sharp sand, and five parts of stone broken to two and one-half centimeters in size. Good sharp gravel of the same size and proportion may be used in the place of broken stone where it can be more readily obtained.

The concrete and masonry for the face walls shall be of the same kind and composition as specified for similar work in other parts of these specifications.

TIMBER AND PILING.

84. *Wooden bridges* may be substituted with the authority of the bureau of public works in the place of masonry or concrete culverts of the size herein specified, in which case special plans will be furnished, the prices to be paid for this class of work to be those named in the proposal herewith.

85. *Timber in foundation* includes all lumber left in the ground after foundations have been constructed, and which forms a necessary part of the same, as grillages, braces, caps, etc., and which is over five (5) centimeters in thickness in the smallest direction.

86. *Timber for bridges* includes all permanent pieces of any dimensions forming constituent parts of the same, from the foundations up, in abutments, piers, trestles, cribs, and in the superstructure.

All timber will be measured and paid in accordance with the actual quantity used and placed and must be of the best obtainable quality, and before accepted is to be rigidly inspected by the engineer in charge.

87. *Piles* for foundations shall be of the required length and size as specified in each case and of such kind and quality as the local engineer may approve. Only the actual lengths left in the work after they have been driven to the satisfaction of the engineer will be paid for at the price agreed upon, which is to include all incidental work connected with placing, driving, and trimming them.

IRON.

88. *Iron braces, ties, washers, bolts, spikes, and nails* used in the construction of bridges and permanently left therein will be paid for by the kilogram at the price named in the contract. All iron used in the erection of temporary scaffolds, centers, forms, frames, boxes, shoring, cofferdams, or other auxiliary plant will not be paid for, and the contractor will be required to offer every facility in ascertaining the correct weights used as specified.

89. *Bridge across Arenas River*.—The bridge consists of a single iron span 11.60 meters long, supported on two stone masonry abutments. The iron structure is formed on two lateral trusses carrying the roadway between their lower chords. The trusses are composed of pin-connected panel units of the system called "extendible bridge." Each panel unit is two meters (2) long and two twenty-five (2.25) mts. in height, except the end panels which are only eighty centimeters (0.80) long. The trusses are connected at the bottom with horizontal wind bracings. The flooring consists of planks fastened to the longitudinal and transverse girders.

The contractor will be required to do all necessary transportation of the material for the bridge from the public works warehouse at Ponce to the site where the structure is to be erected. He shall furnish and place all timber fastenings and all necessaries for the complete erection of the structure, and shall build and launch the structure as directed by the engineer in charge of the work.

All surfaces shall be painted with two coats of approved paint, and before any paint is applied all surfaces must be perfectly clean, all rust and scales being previously removed with proper tools.

ADDITION.

90. *Special condition*.—The contractor will be required to observe strictly the law recently enacted and in force from March 10th, 1904, limiting the maximum time for a working day at eight (8) hours in all work performed and paid out from funds of any dependency of the people of Porto Rico.

PROPOSAL.

June 20/04.

To the Superintendent of Public Works, San Juan, Porto Rico.

SIR: In accordance with your advertisement dated June 6, 1904, inviting proposals for the construction of about 4 kms. of macadamized road in the Mayaguez-Las Marias section, and subject to all the conditions and requirements thereof, and of your instructions to bidders and specifications dated June 6, 1904, copies of all of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we (or I) propose to furnish the material and do the work required in the section of the road named therein, situated between Mayaguez and Las Marias, at the prices named below, viz:

Approximate quantities.

1. Excavation for all material not classified, eighteen thousand and five hundred (18,500) cub. m., at seventeen cents (\$0.17) per cub. m.
2. Excavation in water, thirty (30) cub. m., at one dollar (\$1.00) per cub. m.
3. Excavation of drains, ditches, and water courses, five thousand eight hundred (5,800) lin. m., at ten cents (\$0.10) per lin. m.
4. Broken stone macadam, measured before placed in the road, three thousand four hundred (3,400) cub. m., at one dollar forty-nine cents (\$1.49) per cub. m.
5. Screenings, measured before placed in the road, four hundred and thirty (430) cub. m., at ninety-five cents (\$0.95) per cub. m.
6. Stone laid dry, thirty-five (35) cub. m., at three dollars (\$3.00) per cub. m.
7. Second-class masonry, five (5) cub. m., at fifteen dollars (\$15) per cub. m.
8. Third-class masonry, one hundred and ninety (190) cub. m., at eight dollars fifty cents (\$8.50) per cub. m.
9. Paving laid dry, thirty (30) sqr. m., at one dollar (\$1.00) per sqr. m.
10. Concrete in walls and foundations, one hundred and twenty-five (125) cub. m., at nine dollars fifty cents (\$9.50) per cub. m.
11. Concrete drain pipe, 80 centim. diameter, fifty (50) cub. m., at twelve dollars (\$12.00) per cub. m.
12. Timber in bridges, four (4) cub. m., at twenty-one dollars fifty cents (\$21.50) per cub. m.
13. Wheel guards, stone, four (4) pieces, at five dollars (\$5.00) each.
14. Transportation, erection, scraping, and painting of Arenas River bridge, at \$276.00.

We (or I) make this proposal with a full knowledge of the kind, quantity, and quality of the material and work required, and if it is accepted will, within ten (10) days after receiving written notice of such acceptance, enter into contract with good and sufficient sureties for the faithful performance thereof, and agree to complete the work in the time specified.

(Signature) VICTOR HONORÉ,
(Address) Calle del Sol.

Witness:

(Signed) M. SALGUERO.

ARTICLES OF AGREEMENT.

1. This agreement entered into this 8th day of July, nineteen hundred and four, between P. F. Fernandez, supt. of public works of the island of Porto Rico, of the first part and Victor Honoré, of Mayaguez, Porto Rico, of the second part:

Witnesseth, That in conformity with the advertisement and specifications hereunto attached and the plans and profiles filed in the office of the bureau of public works, which form a part of this contract, the said P. F. Fernandez, for and in behalf of the government of the island of Porto Rico, and the said Victor Honoré, do covenant and agree to and with each other, as follows:

2. That the party of the second part will furnish and deliver the following materials and will perform and provide the necessary labor required in the construction and for the completion of the road Consumo-Las Marias at the prices as given opposite each item in his bid, dated June 20, 1904, a copy of which is herewith attached, as follows:

1. 18,500 cub. m. excavations of materials not classified, at seventeen cents (0.17c) per cub. metre.
2. 30 cub. m. excavation in water at one dollar (1) per cub. metre.
3. 5,800 lin. m. excavations for drains, ditches, and water courses, at ten cents (0.10) per lin. metre.

4. 3,400 cub. m. broken stone macadam, measured before placed in the road, at one dollar and forty-nine cents (1.49) per cub. metre.

5. 430 cub. m. screenings, measured before placed in the road, at ninety-five cents (0.95) per cub. metre.

6. 35 cub. m. stone laid dry, at three dollars (3) per cub. metre.

7. 5 cub. m. second-class masonry, at fifteen dollars (15) per cub. metre.

8. 190 cub. m. third-class masonry, at eight dollars and fifty cents (8.50) per cub. metre.

9. 30 sqr. m. paving laid dry, at one dollar (1) per sqr. metre.

10. 125 cub. m. concrete in walls and foundations, at nine dollars and fifty cents (9.50) per cub. metre.

11. 50 cub. m. concrete drain pipe 0.80 centm. diameter, at twelve dollars (12) per cub. metre.

12. 4 cub. m. timber in bridges, at twenty-one dollars and fifty cents (21.50) per cub. metre.

13. 4 wheel guards, stone, at five dollars (5) each.

3. And the party of the first part, for and in behalf of the government of Porto Rico, agrees to pay to the party of the second part for all such material delivered and accepted and for all labor performed in the prosecution and completion of the work as required by this agreement the rates above specified and agreed upon.

4. The said Victor Honoré shall commence work under this contract on or before the 18th day of July, nineteen hundred and four, and shall complete the said work on or before the 18th day of December, nineteen hundred and four (1904).

5. That the general conditions governing contracts for insular public works in force since July, 1902, apply to this contract in so far as they are not modified by the stipulations herein contained and in the instructions to bidders and specifications herewith attached and forming part of this contract.

6. If in any event the party of the second part shall delay or fail to commence with the delivery of the material or the performance of the work on the day specified herein, or shall, in the judgment of the superintendent of public works, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the party of the first part, or his successor legally appointed, shall have power, with the sanction of the commissioner of the interior, to annul this contract by giving notice in writing to that effect to the party of the second part; and upon the giving of such notice the contract shall be annulled and all money due or to become due to the party of the second part by reason of this contract, in the amount of the guaranty of 10% of the original estimate of the work, viz, \$1,984, shall become forfeited to the people of Porto Rico, in accordance with provision in section 34 of the general conditions forming part of this contract, and the party of the first part shall be thereupon authorized, if an immediate performance of the work be, in his opinion, required by the public exigency, to proceed to provide for said performance by administration or contract; provided, however, that if the party of the second part shall by violence of the elements or other force, and by no fault of his own, be prevented either from commencing or completing the work at the time agreed upon in this contract such additional time may be allowed him, in writing, for such commencement or completion as in the judgment of the party of the first part shall be just and reasonable, but such allowance and extension shall in no manner affect the right or obligations of the parties under this contract, but the same shall subsist, take effect, and be enforceable precisely as if the new date for such commencement or completion had been the date originally herein agreed upon.

7. It is further understood and agreed that in case of failure of the party of the second part to complete this contract as specified and agreed upon, that if the guaranty of 10% thereby forfeited to the people of Porto Rico does not cover any or all damages due to such failure in excess of the sum so forfeited, the people of Porto Rico shall have the right to recover from the party of the second part or from his sureties whatever sums may be expended by the party of the first part in completing the said contract in excess of the price herein stipulated to be paid to the party of the second part for completing the same.

8. Monthly payments shall be made to the said Victor Honoré during the progress of the work in proportion as the material and labor contracted for shall have been furnished, reserving ten per cent (10%) from each payment until the whole work has been finally accepted and requirements have been complied with as provided in sections 38-41 of the general conditions forming part of this contract.

9. Neither this contract nor any interest therein shall be transferred to any other party or parties, and all rights of action for any breach of this contract by said Victor Honoré are reserved to the people of Porto Rico.

10. No person belonging to or employed in the service of the government of Porto Rico is or shall be admitted to any share or part of this contract, or to any benefit which may arise herefrom.

11. This contract shall be subject to approval of the commissioner of the interior. In witness whereof the parties aforesaid have hereunto placed their hands the date first hereinbefore written.

Witnesses:

(Signed) ED. H. JONES,

as to (Signed) P. F. FERNANDEZ,
Superintendent of Public Works.

(Signed) J. W. BLANCO,

as to VICTOR HONORE.

Approved, July 18, 1904.

(Signed) W. H. ELLIOTT,

Commissioner of the Interior.

BOND WITH CONTRACT.

United States of America, island of Porto Rico.

Know all men by these presents, that Victor Honoré, of Mayaguez, P. R., as principal, and Andrés Orsiní and Jose Cajiga, as sureties, are held and firmly bound unto "the People of Porto Rico" in the sum of one thousand nine hundred and eighty-four dollars (\$1,984), and for which payment, well and truly to be made to the people of Porto Rico, we firmly bind ourselves, our successors, heirs, and legal representatives, jointly and severally by these presents.

The condition of the above obligation is such that whereas the said Victor Honoré has entered into a certain contract, hereto attached, with P. F. Fernandez, superintendent of public works, acting for and in behalf of the people of Porto Rico, bearing date the 8th day of July, A. D. 1904; now, if the said Victor Honoré shall well and truly fulfill all the covenants and conditions of said contract and shall perform all the undertakings therein stipulated by him to be performed, and shall perform all the work and furnish all the labor and material required by, any and all changes in, additions to, or omissions from said contract, which may hereafter be made within the term specified for the completion or within any extension of time allowed him for said completion, notice thereof to the said sureties being hereby waived, and shall promptly make payments to all persons supplying him labor or material in the prosecution of the work contemplated by said contract; then this obligation to be void, otherwise to remain in full force and virtue.

In testimony whereof the said Victor Honoré, as principal, and André Orsiní and Jose Cajiga, as sureties, have hereunto subscribed their hands and affixed their seals this 8th day of July, A. D. 1904.

Signed, sealed, and delivered in the presence of:

Witness:

(Signed) J. W. BLANCO.

(Signed) VICTOR HONORE.

(Signed) RAFAEL MARGUAL.

(Signed) DR. ANDRÉS ORSINI.

(Signed) JUAN RODRIGUEZ ACOSTA.

(Signed) JOSE CAJIGA.

BONDSMEN'S OATH.

Justification.

ISLAND OF PORTO RICO, Town of San Juan, ss:

Personally appeared before me, a notary public, the said Andrés Orsiní, who signed the foregoing obligation, and who, being by me first duly sworn according to law, deposes and says that he is worth the sum of one thousand nine hundred and eighty-four (1,984) dollars over and above his just debts, legal liabilities, and lawful exemptions, that he is a property holder in the island of Porto Rico, and he resides at Mayaguez, P. R.

Dr. ANDRÉS ORSINI.

Subscribed and sworn to before me this eighth day of July, A. D. 1904.

[SEAL.]

JUAN QUINTERO.

BONDSMEN'S OATH.

Justification.

ISLAND OF PORTO RICO, Town of San Juan, ss:

Personally appeared before me, a notary public, the said Jose Cajiga, who signed the foregoing obligation, and who, being by me first duly sworn according to law, deposes and says that he is worth the sum of one thousand nine hundred and eighty-four (1,984) dollars over and above his just debt, legal liabilities, and lawful exemptions, that he is a property holder in the island of Porto Rico, and he resides at Mayaguez, P. R.

JOSE CAJIGA X.

TESTIGO JUAN RODRIGUEZ ACOSTA.

Subscribed and sworn to before me this eighth day of July, A. D. 1904.

[SEAL.]

JUAN QUINTERO.

APPENDIX K.

TESTS MADE IN THE ROAD MATERIAL LABORATORY AT WASHINGTON OF TWELVE SAMPLES OF ROCK USED IN ROAD WORK IN PORTO RICO.

[United States Department of Agriculture, Bureau of Chemistry, H. W. Wiley, chief. Road Material Laboratory, Logan Waller Page, chief.]

SEPTEMBER 30, 1903.

Mr. A. STIERLE,

Superintendent of Public Works, San Juan, P. R.

DEAR SIR: I have the honor to submit the results of tests on the 12 samples of rock shipped to this laboratory on the 12th of August last. I regret that the tests could not be made sooner, but at this season of the year our work is very excessive.

As the results show, your samples have a fairly high average; sample No. 804 (12) is a particularly good rock for main highways, and I hope that the supply is large and accessible. I inclose a small pamphlet, which will explain our method of classifying traffic, and in a few weeks I will send you a copy of a bulletin which is now in press, explaining our methods of work.

If there is anything further we can do for you, it will afford the greatest pleasure.

Respectfully,

(Signed) LOGAN WALLER PAGE,
Chief of Road Material Laboratory.

REPORT ON SAMPLE NO. 793 (1) OF ROAD MATERIAL FROM (CAGUAS) RIO PIEDRAS, P. R. (ROAD NO. 1, KILOMETER 21).

Made at the request of superintendent of public works, San Juan, P. R.
Material: Limestone.

Results of physical tests on sample submitted, and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity.....	2.7	3.1	2.1
Weight per cubic foot.....	pounds.	168.8	192.8
Water absorbed per cubic foot.....	do.....	.2	.03
Percent of wear.....		5.8	34.2
French coefficient of wear		6.9	19.0
Cementing value.....		30	231

Will give best results on light-traffic roads.
September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE NO. 793 (1) OF ROAD MATERIAL FROM (CAGUAS) RIO PIEDRAS, P. R. (ROAD NO. 1, KILOMETER 21).

Made at the request of superintendent of public works, San Juan, P. R.

Character of material: Sedimentary rock.

Name: Limestone.

Essential mineral: Calcite (carbonate of lime), 96.55 per cent.

Accessory minerals: Volcanic sand, 2.95 per cent.

Chemical analysis.

	Per cent.
Lime (CaCO_3)	96.55
Insoluble in HCl	2.95
Total	99.50

Total

Specimen is a massive dove-colored limestone, a small amount of fine volcanic sand as an impurity.

September 29, 1903.

REPORT ON SAMPLE NO. 794 (2) OF ROAD MATERIAL FROM CAYEY, P. R. (ROAD NO. 1, KILOMETER 61.4).

Made at the request of superintendent of public works, San Juan, P. R.

Material: Limestone.

Results of physical tests on sample submitted, and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity	2.7	3.1	2.1
Weight per cubic foot	pounds. 168.8	192.8	138.1
Water absorbed per cubic foot	do. .08	4.8	.03
Per cent of wear	5.1	34.2	2.1
French coefficient of wear	7.9	19.0	1.2
Cementing value	28	231	8

Similar to 793 (1).

September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE NO. 794 (2) OF ROAD MATERIAL FROM CAYEY, P. R. (ROAD NO. 1, KILOMETER 61.4).

Made at the request of superintendent of public works, San Juan, P. R.

Character of material: Sedimentary rock.

Name: Limestone.

Essential mineral: 97.15 per cent.

Accessory minerals: Volcanic sand, 2.40 per cent.

Chemical analysis.

	Per cent.
Lime (CaCO_3)	97.15
Insoluble in HCl	2.40
Organic matter .....	.25
Phosphoric acid (P_2O_5)	Trace.
Total	99.80

Specimen is a coarse-grained, dark-gray limestone, containing some volcanic sand (decomposed rock glass) and organic matter as impurities.

September 29, 1903.

REPORT ON SAMPLE No. 795 (3) OF ROAD MATERIAL FROM BAYAMON, P. R. (ROAD No. 2, KILOMETER 6.9).

Made at the request of superintendent of public works, San Juan, P. R.
Material: Limestone.

Results of physical tests on sample submitted, and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity.....	2.7	3.1	2.1
Weight per cubic foot..... pounds.	168.8	192.8	138.1
Water absorbed per cubic foot..... do.....	.6	4.8	.08
Per cent of wear	5.3	34.2	2.1
French coefficient of wear	7.5	19.0	1.2
Cementing value.....	16	231	8

Will give best results under country road traffic.

September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE No. 795 (3) OF ROAD MATERIAL FROM BAYAMON, P. R. (ROAD No. 2, KILOMETER 6.9).

Made at the request of superintendent of public works, San Juan, P. R.

Character of material: Sedimentary rock.

Name: Limestone.

Essential mineral: Calcite (carbonate of lime), 97.85 per cent.

Accessory minerals: Insoluble residue, 1.74 per cent.

Secondary minerals: Limonite, 0.50 per cent.

Chemical analysis.

	Per cent.
Alumina (Al_2O_3)	} 0.45
Iron oxide (Fe_2O_3)	}
Lime (CaCO_3)	97.85
Insoluble in HCl	1.74
Total	100.04

Specimen is a fine-grained, light reddish-brown limestone, containing some limonite and insoluble siliceous clay as impurities.

September 29, 1903.

REPORT ON SAMPLE No. 796 (4) OF ROAD MATERIAL FROM JUNCOS, P. R. (ROAD No. 5, KILOMETER 17.5).

Made at the request of superintendent of public works, San Juan, P. R.

Material: Quartz diorite.

Results of physical tests on sample submitted, and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity.....	2.8	3.2	2.7
Weight per cubic foot..... pounds.	175.0	200.0	168.8
Water absorbed per cubic foot..... do.....	.09	1.0	.1
Per cent of wear	2.8	3.9	1.6
French coefficient of wear	14.5	20.6	10.2
Cementing value.....	1	137	1

The resistance to wear of this sample is good, but it has practically no cementing value. It should do well under highway and suburban traffic if a good binder is used.

September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE No. 796 (4) OF ROAD MATERIAL FROM JUNCOS, P. R. (ROAD No. 5, KILOMETER 17.5).

Made at the request of superintendent of public works, San Juan, P. R.
Character of material: Igneous rock.

Name: Quartz diorite.

Essential mineral: Plagioclase (silicate of alumina, lime, and soda); kaolin (hydrous silicate of alumina), 50.6 per cent; hornblende (silicate of alumina, lime, magnesia, and iron), 24 per cent; quartz (silica), 20 per cent.

Accessory minerals: Magnetite (magnetic oxide of iron), 5 per cent; apatite (phosphate of lime), 0.1 per cent.

Secondary minerals: Limonite (hydrous oxide of iron), 0.3 per cent.

Specimen is a light-gray, coarse-grained rock, composed chiefly of kaolinized plagioclase (andesine), quartz, and green hornblende.

September 29, 1903.

REPORT ON SAMPLE No. 797 (5) OF ROAD MATERIAL FROM ARECIBO, P. R. (ROAD No. 6, KILOMETER 1.4).

Made at the request of superintendent of public works, San Juan, P. R.
Material: Limestone.

Results of physical tests on sample submitted and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity	2.5	3.1	2.1
Weight per cubic foot	156.3	192.8	138.1
Water absorbed per cubic foot .....	.9	4.8	.03
Per cent of wear	7.4	34.2	2.1
French coefficient of wear	5.4	19.0	1.2
Cementing value	108	231	8

Should give excellent results under highway and country road traffic.
September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE No. 797 (5) OF ROAD MATERIAL FROM ARECIBO, P. R. (ROAD No. 6, KILOMETER 1.4).

Made at the request of superintendent of public works, San Juan, P. R.
Character of material: Sedimentary rock.

Name: Limestone.

Essential mineral: Calcite (carbonate of lime), 99.80 per cent.

Accessory mineral: Volcanic sand, 0.36 per cent.

Chemical analysis.

	Per cent.
Lime (CaCO_3)	99.80
Magnesia (MgO)	}
Alkali (K_2O}) .....	.36
Total	100.16

Specimen is a fine-grained, grayish yellow limestone, containing a small amount of volcanic sand (decomposed rock glass) as an impurity.

September 29, 1903.

REPORT ON SAMPLE NO. 798 (6) OF ROAD MATERIAL FROM CAROLINA, P. R. (ROAD NO. 7, KILOMETER 16.3).

Made at the request of superintendent of public works, San Juan, P. R.
Material: Limestone.

Results of physical tests on sample submitted and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity	2.7	3.1	2.1
Weight per cubic foot	168.8	192.8	138.1
Water absorbed per cubic foot .....	.5	4.8	.03
Per cent of wear	5.2	34.2	2.1
French coefficient of wear	7.7	19.0	1.2
Cementing value	27	231	8

Similar to 793 (1).
September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE NO. 798 (6) OF ROAD MATERIAL FROM CAROLINA, P. R. (ROAD NO. 7, KILOMETER 16.3).

Made at the request of superintendent of public works, San Juan, P. R.

Character of material: Sedimentary rock.

Name: Limestone.

Essential minerals: Calcite (carbonate of lime), 92.37 per cent; dolomite (carbonate of lime and magnesia), 5.69 per cent.

Accessory mineral: Quartzose clay, 1.3 per cent.

Secondary mineral: Limonite (hydrated iron oxide), 0.64 per cent.

Chemical analysis.

	Per cent.
Iron oxide (Fe_2O_3)	0.50
Lime ($CaCO_3$)	95.53
Magnesia (MgO)	2.53
Insoluble in HCl	1.30
Total	99.86

Specimen is a fine-grained, dove-colored limestone, containing some dolomite, quartz, and limonite as impurities.

September 29, 1903.

REPORT ON SAMPLE NO. 799 (7) OF ROAD MATERIAL FROM RIO PIEDRAS, P. R. (ROAD NO. 7, KILOMETER 5.5).

Made at the request of superintendent of public works, San Juan, P. R.

Material: Limestone.

Results of physical tests on sample submitted and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity	2.6	3.1	2.1
Weight per cubic foot	162.5	192.8	138.1
Water absorbed per cubic foot .....	.8	4.8	.03
Per cent of wear	6.3	34.2	2.1
French coefficient of wear	6.3	19.0	1.2
Cementing value	91	231	8

Should give excellent results under country road traffic. Too soft for heavy traffic.
September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE No. 799 (7) OF ROAD MATERIAL FROM RIO PIEDRAS, P. R. (ROAD No. 7, KILOMETER 5.5).

Made at the request of superintendent of public works, San Juan, P. R.

Character of material: Sedimentary rock.

Name: Limestone.

Essential mineral: Calcite (carbonate of lime), 97.96 per cent.

Accessory mineral: Siliceous clay, 1.40 per cent.

Secondary mineral: Limonite (hydrated oxide of iron), 1 per cent.

Chemical analysis.

	Per cent.
Iron oxide (Fe_2O_3)	0.97
Lime ($CaCO_3$)	97.96
Insoluble in HCl	1.40
Total	100.33

Specimen is a fine-grained, vesicular limestone of a light yellowish-brown color, containing some limonite and quartz as impurities.

September 29, 1903.

REPORT ON SAMPLE No. 800 (8) OF ROAD MATERIAL FROM COMERIO, P. R. (ROAD No. 9, COMERIO NORTH).

Made at the request of superintendent of public works, San Juan, P. R.

Material: Limestone.

Results of physical tests on sample submitted and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity	2.7	3.1	2.1
Weight per cubic foot	pounds.. 168.8	192.8	138.1
Water absorbed per cubic foot	do. .1	4.8	.03
Per cent of wear	6.0	34.2	2.1
French coefficient of wear	6.7	19.0	1.2
Cementing value	135	231	8

Same will apply as does to 797 (5).

September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE No. 800 (8) OF ROAD MATERIAL FROM COMERIO, P. R. (ROAD No. 9, COMERIO NORTH),

Made at the request of superintendent of public works, San Juan, P. R.

Character of material: Sedimentary rock.

Name: Limestone.

Essential mineral: Calcite (carbonate of lime), 94 per cent.

Accessory minerals: Phosphorite (phosphate of lime), 0.2 per cent; quartz (silica), 4.70 per cent.

Secondary mineral: Limonite (hydrated oxide of iron), 1 per cent.

Chemical analysis.

	Per cent.
Alumina (Al_2O_3)	1.15
Iron oxid (Fe_2O_3)	}
Lime ($CaCO_3$)	94.00
Insoluble in HCl	4.80
Phosphoric acid (P_2O_5) .....	.10
Total	100.05

Specimen is a fine-grained dove-colored limestone, containing some fine quartz sand, limonite, and phosphorite as impurities.

September 29, 1903.

REPORT ON SAMPLE NO. 801 (9) OF ROAD MATERIAL FROM UTUADO, P. R. (ROAD NO. 6, KILOMETER 28.7).

Made at the request of superintendent of public works, San Juan, P. R.
Material: Quartz diorite.

Results of physical tests on sample submitted and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample sub- mitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity	2.7	3.2	2.7
Weight per cubic foot	168.8	200.0	168.8
Water absorbed per cubic foot .....	.4	1.0	.1
Per cent of wear	4.0	3.9	1.6
French coefficient of wear	10.0	20.6	10.2
Cementing value.....	28	137	1

Should give satisfactory results under country road, highway, and suburban traffic.
September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE NO. 801 (9) OF ROAD MATERIAL FROM UTUADO, P. R. (ROAD NO. 6, KILOMETER 28.7).

Made at the request of superintendent of public works, San Juan, P. R.
Character of material: Igneous rock.

Name: Quartz diorite.

Essential minerals: Plagioclase (silicate of alumina, lime, and soda) + kaolin (hydrous silicate of alumina), 57.5 per cent; hornblende (silicate of lime, magnesia, iron, and alumina), 17 per cent; quartz (silica), 12 per cent.

Accessory minerals: Magnetite (magnetic oxide of iron), 3 per cent; apatite (phosphate of lime), 0.1 per cent.

Secondary minerals: Epidote (hydrous silicate, alumina, and iron), 6 per cent; chlorite (hydrous silicate of magnesia, iron, and alumina), 4 per cent.

Specimen is a decomposed light greenish-gray plutonic rock, composed essentially of kaolinized and epidotized plagioclase (andesine), quartz, and green chloritized hornblende.

September 29, 1903.

REPORT ON SAMPLE NO. 802 (10) OF ROAD MATERIAL FROM MANATI, P. R. (ROAD NO. 11, MANATI TO CIALES, KILOMETER 3).

Made at the request of superintendent of public works, San Juan, P. R.
Material: Limestone.

Results of physical tests on sample submitted and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample sub- mitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity	2.6	3.1	2.1
Weight per cubic foot	162.5	192.8	138.1
Water absorbed per cubic foot .....	.9	4.8	.03
Per cent of wear	5.2	34.2	2.1
French coefficient of wear.....	7.7	19.0	1.2
Cementing value.....	64	231	8

Will do well under light traffic.
September 29, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE No. 802 (10) OF ROAD MATERIAL FROM MANATI, P. R. (ROAD NO. 11, MANATI TO CIALES, KILOMETER 3).

Made at the request of superintendent of public works, San Juan, P. R.

Character of material: Sedimentary rock.

Name: Limestone.

Essential mineral: Calcite (carbonate of lime), 93.40 per cent.

Accessory mineral: Quartzose clay, 5.31 per cent.

Secondary mineral: Limonite (hydrated oxide of iron), 1 per cent.

Chemical Analysis.

	Per cent.
Iron oxide (Fe_2O_3)	0.74
Lime (CaCO_3)	93.40
Magnesia (MgO)	Trace.
Insoluble in HCl	5.31
Total	99.45

Specimen is a fine-grained, brownish yellow, vesicular limestone, containing some clay and limonite as impurities.

September 29, 1903.

REPORT ON SAMPLE No. 803 (11) OF ROAD MATERIAL FROM RIO PIEDRAS, P. R. (ROAD NO. 1, KILOMETER 16).

Made at the request of superintendent of public works, San Juan, P. R.

Material: Basalt tuff.

Results of physical tests on sample submitted, and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity	2.7	3.0	2.4
Weight per cubic foot	pounds.	168.8	189.4
Water absorbed per cubic foot	do.	1.1	6.4
Per cent of wear		3.5	16.6
French coefficient of wear		11.3	30.4
Cementing value		25.0	72.0

The same applies to this sample as does to No. 801 (9).

September 28, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE No. 803 (11) OF ROAD MATERIAL FROM RIO PIEDRAS, P. R. (ROAD NO. 1, KILOMETER 16).

Made at the request of superintendent of public works, San Juan, P. R.

Character of material: Volcanic rock.

Name: Basalt tuff.

Essential mineral: Augite (silicate of lime and magnesia), plagioclase (silicate of alumina, lime, and soda), rock glass.

Accessory minerals. Magnetite (magnetic oxide of iron), pyrite (disulphide of iron).

Secondary minerals: Calcite (carbonate of lime), chlorite (hydrous silicate of magnesia, iron, and alumina), epidote (hydrous silicate of lime and alumina), limonite (hydrated oxide of iron).

Chemical analysis.

	Per cent.
Alumina (Al_2O_3)	} 14.72
Iron oxide (Fe_2O_3)	} 16.16
Lime (CaCO_3)	2.90
Magnesia (MgO)	15.16
Loss on ignition	51.15
Insoluble in HCl	
Total	100.09

Specimen is a dark gray, fine-grained, fragmental rock, composed essentially of angular particles of vitreous basalt, augite, plagioclase, and magnetite, cemented together by calcite (25 per cent).

September 28, 1903.

REPORT ON SAMPLE NO. 804 (12) OF ROAD MATERIAL FROM GURABO, P. R. (ROAD NO. 5, KILOMETER 7.1).

Made at the request of superintendent of public works, San Juan, P. R.
Material: Basalt breccia.

Results of physical tests on sample submitted, and a comparison with highest and lowest results obtained on material of a similar nature.

	Results on sample submitted.	Results on similar materials.	
		Highest.	Lowest.
Specific gravity.....	3.0	3.0	2.4
Weight per cubic foot.....	187.5	189.4	147.5
Water absorbed per cubic foot.....	.3	6.4	.1
Per cent of wear.....	3.5	16.6	1.3
French coefficient of wear.....	11.5	30.4	2.4
Cementing value	146.0	72.0	2.0

This sample has a fairly high resistance to wear and is more than 100 per cent higher in its cementing value than any rock of its class tested in this laboratory. It should give excellent results on all but city traffic roads. It is an unusually good road-making rock.

September 28, 1903.

CHEMICAL AND MINERAL COMPOSITION OF SAMPLE NO. 804 (12) OF ROAD MATERIAL FROM GURABO, P. R. (ROAD NO. 5, KILOMETER 7.1).

Made at the request of superintendent of public works, San Juan, P. R.

Character of material: Volcanic rock.

Name: Basalt breccia.

Essential mineral: Augite (silicate of lime and magnesia), 51.2 per cent; plagioclase (silicate of alumina, lime, and soda) + scolecite (hydrous silicate of lime and alumina), 10.5 per cent; rock glass, 14 per cent.

Accessory minerals: Magnetite (magnetic oxide of iron), 3 per cent.

Secondary minerals: Chlorite (hydrous silicate of magnesia, alumina, and iron), 11 per cent; epidote (hydrous silicate of lime, iron, and alumina), 7 per cent; calcite (carbonate of lime), 3 per cent; limonite (hydrous oxide of iron), 3 per cent.

Chemical analysis.

	Per cent.
Silica (SiO_2).....	45.68
Alumina (Al_2O_3)	9.89
Iron oxide (Fe_2O_3)	13.67
Titanium oxide (TiO_2).....	1.58
Lime (CaCO_3)	13.00
Magnesia (MgO)	8.26
Alkali (K_2O)	4.00
Alkali (Na_2O)	3.55
Loss on ignition.....	.11
Phosphoric acid (P_2O_5) .....	.11
Total	99.74

Specimen is a dark grayish green, medium grained, fragmental rock, consisting essentially of augite and feldspar crystals and fragments of vitreous basalt, cemented together by devitrified rock glass.

September 28, 1903.

EXHIBIT C.

REPORT OF THE SUPERINTENDENT OF INSULAR TELEGRAPH.

DEPARTMENT OF THE INTERIOR OF PORTO RICO,
BUREAU OF INSULAR TELEGRAPH,
San Juan, P. R., June 30, 1904.

SIR: The following report of operation and maintenance of the bureau of insular telegraph for the fiscal year 1903-4 is submitted in compliance with the request contained in your letter of May 16, 1904.

The close of the present fiscal year finds the insular telegraph of Porto Rico in an efficient condition and with increased earning capacity. The system, though extended but little in mileage, has been increased in the number of offices over the previous year.

While but a limited amount of work as to extending the mileage of lines was done during the past year, attention has been given to repair of all lines in operation, which have been placed in as good state of repair as available funds for contingent expenses permitted. Since September 1, 1903, general repair and reconstruction work has been in progress, and as far as practicable all unserviceable poles, cross arms, wire, pins, and brackets have been replaced by new material, and as a result of these renewals the lines at this date are in a general good condition. However, in some sections, owing to limited amount of new poles on hand, a number of supports in a somewhat advanced stage of decay were left standing. These will be replaced by new ones as soon as money is available for purchase of this class of material.

All general repair work, as well as the reconstruction of various sections of lines hereinafter mentioned, has been done under the supervision of the chief lineman of this bureau, assisted by such number of additional linemen and laborers as the nature of the work in hand required and as was consistent with economy, with a view to pushing the work as rapidly as possible. Whenever possible poles for repair work have been purchased in the vicinity where used, which, on account of excessive rates for wagon transportation, has proved to be the most economical way of providing this class of line material. The cost of repair work has been materially reduced by this saving in transportation of poles, and the total cost of all repairs made to lines for the year has been comparatively small.

I am glad to be able to state, as will appear in subsequent paragraphs of this report, that the telegraph continues to show an increase in the volume of business handled as well as in the amount of revenue derived therefrom, and to state that improvement in the efficiency of the personnel keeps pace with the increase in both volume of business and earnings. The past record for care and accuracy in handling messages has been maintained by the faithful and intelligent performance of duty by each individual employee.

The record shown by the bureau of insular telegraph from date of its establishment for prompt and accurate service, considering that only a few years ago a majority of the operators comprising the personnel were without training or experience in telegraph work, is gratifying to the superintendent, and reflects credit upon the corps of employees, it being the result of labor begun under unfavorable and somewhat discouraging conditions, the story of which has been related in preceding reports.

Of the Port Rican operators now in the service the majority are the product of exclusive training by this service, either in the school maintained at San Juan or at telegraph offices, where they served as employees in a minor capacity while preparing themselves for work as operators.

The high state of proficiency as operators developed and maintained by a number of the young ladies who have been employed is in many cases gratifying. They possess the ability to transmit and receive messages over the wire in a manner that would do credit to members of the telegraph profession of longer experience; their work is prompt and reliable and their monthly reports are models of neatness and accuracy, being always prepared and rendered when due.

Since June 30, 1903, 8 additional offices have been opened to the public, making a total of 40 stations in operation by this service on date of this report. Some of these new stations were not established until recently, and for that reason the earnings as shown for the year can not be taken as a basis of what the total earnings would have been had all the offices been in operation for the whole year. Probably 15 per cent increase of total receipts shown would not be overestimating the results for a year of all the offices.

EXTENSION OF LINES.

Extension in mileage of line made to the system consists of a new line built extending from Humacao to Yabucoa, a distance of 15 kilometers. At San Juan the lines entering the city were extended to the branch office, established January 1, 1904, on the pier of the New York and Porto Rico Steamship Company, and at Mayaguez the lines entering that city were extended from the playa to the city proper, where, on May 1, 1904, a telegraph office was established.

In considering extension, mention might also be made of the loop at Vega Baja, connecting the station at that place with the main line, consisting of about 1 kilometer of wire, in all a total extension of about 19 kilometers of line.

Prior to January 1, 1904, but one office was maintained in the capital by this service, and, owing to the constantly increasing volume of business, this proved inadequate to render efficient service. The branch office at San Juan was opened with the view of relieving the congestion at the main office and at the same time increase still further the volume of business by offering to the public the convenience of a station situated in the wholesale business section. The opening of the branch office has justified both expectations.

At Mayaguez the only telegraph office in that city prior to May 1, 1904, was maintained at or near the playa, and telegrams for the city proper had to be delivered by messenger, a distance of about a mile. The increase in volume of business for that place showed that an office in the city, as well as at the playa, would prove a valuable addition to the service and facilitate the handling of telegrams to and from Mayaguez. Hence, on May 1, 1904, an additional office was established there, the main office being situated on the plaza in the city, while the playa station, operated as a branch office with main line connections, was moved to a more convenient and advantageous location in the principal business section. This arrangement was designed both to facilitate the handling of messages and to encourage, by offering convenience to the public, a further increase from that point in volume of same.

HELIOGRAPH SERVICE.

On May 1, 1904, the heliograph station at La Fortuna was moved to the town of La Ceiba. At times when shipping was heavy at Vieques, a number of vessels being in the harbor at Isabel II, interference by masts and sails frequently interrupted the signals and proved a source of considerable annoyance, resulting occasionally in delay to messages. Being desirous of eliminating such interferences, a search was made for a more desirable site for the Porto Rico station. After several experiments a most desirable location was found at La Ceiba, there being no obstruction of any kind to interfere with the signals from that point. Besides providing a better course over which to work both day and night, the establishment of the office at La Ceiba, a town of considerable size and of more or less commercial importance, provides it with a telegraph office, from which sufficient revenue is expected to equal the cost of rent and light at that station.

Aside from the interferences above mentioned, the heliograph service has been excellent and seems to meet every requirement of the place. The records show that as many as 125 messages have been exchanged between the two stations in a day, most of them containing 20 words and some having as many as 150 words in the text. This of course is not the maximum amount of work that can be handled, but it represents a fair day's work for two men, neither of whom had assistance, and is mentioned merely to show what is capable of being done with the instruments in use when operated by capable men. I will also add, with a view to pointing out the reliability of this method of signaling, that not a single complaint has been received at this office relative to errors made in transmission, and it is believed that none have occurred, which is indeed remarkable.

RECONSTRUCTION OF LINES.

The work of removing the lines built by the Signal Corps, United States Army, from their almost inaccessible location in many places to alongside the public highway was begun September 1, 1903. Owing to inadequate amount of funds available to move all of the lines so situated, only such sections where poles were in a bad state of decay were removed. In rebuilding these portions of the line new poles 7 and 8 meters long, of native hardwood, were used.

The first section thus rebuilt was that between Caguas and Humacao, a distance of 30 kilometers. But few of the old poles in this line were found serviceable and therefore new material was used. The line as reconstructed follows closely the course of the carretera between the towns mentioned above. This work, begun on the date above stated, was completed September 15, 1903, at a total cost for labor and transportation of \$841.37.

The next section receiving attention was along the military road between San Juan and Ponce, between kilometers 82, south of Aibonito, and 51, south of Las Cruces, 31 kilometers, all of which was built along or follows closely the course of the road above mentioned and consists of first-class material throughout. The work began October 1, 1903, was concluded November 17, 1903, and the cost incurred for labor and transportation was \$1,290.25.

Upon the completion of this work near Las Cruces November 17, 1903, the construction gang was transferred to San Juan. Work was resumed on the San Juan-Ponce section at San Justo street, San Juan, December 23, 1903, and all poles and cross-arms were replaced by new ones, transferring the line at places where it was distant from the public highway from its former site to alongside the military road as far south as La Muda, a distance of 23 kilometers, the cost for labor and transportation being \$583.94.

On account of lack of funds to purchase poles, this class of work was discontinued, leaving portions of the line in need of like repairs unattended. However, a sum sufficient to purchase poles to reconstruct the line between Aguadilla and Lares was asked for in the deficiency estimate at the last session of the legislature. The sum asked for having been provided and available for use March 10, 1904, a contract for 300 telegraph poles was entered into, and upon their delivery May 1, 1904, work of rebuilding the Aguadilla-Lares section of line was begun. The new poles purchased, supplemented by a number of old poles found in good state of preservation, were sufficient to complete the repairs to this section, consisting of 37 kilometers. The work was concluded June 1, 1904, at a cost, including purchase of poles, transportation of all material, pay for labor, and per diem allowance to skilled linemen, of \$924.05.

The poles and other material used on sections San Juan-Ponce (Aibonito-Las Cruces and San Juan-La Muda) and Caguas-Humacao were on hand, having been purchased from funds provided for in the budget for the fiscal year 1902-3.

All of the reconstruction work above mentioned, including purchase of poles for the Aguadilla-Lares section, was done at a total cost of \$3,639.61, an average of \$30.08 per kilometer.

To have continued the work of rebuilding the telegraph lines requiring such attention, transferring them from cane and pasture fields and other undesirable places where many of the lines now are and mostly on private property, would have been desirable, but after providing for the maintenance of the system, the balance available proved inadequate to carry the work beyond that of placing the poles on hand, purchased the previous year as above mentioned.

FUNDS APPROPRIATED FOR CONTINGENT EXPENSES.

The amount appropriated for contingent expenses for the fiscal year 1903-4 was small. The sum designated for purchase of material of all kinds was \$3,520, exceeding by a small margin the cost of maintenance during the year, including repairs to the lines and purchase of battery material and telegraph instruments.

A balance of \$668.59, pertaining to "trust fund" 1901-2, subsequently transferred to the budget for the fiscal year 1902-3, and later transferred to the fund for contingent expenses 1903-4, "to be used exclusively for extension of lines" was utilized in purchase of poles for Humacao-Yabucoa telegraph line and for the construction of same. Other sums appropriated for contingent expenses, appearing under various subheads, have been expended under such headings for the purpose for which they were appropriated, except such balance as may hereafter be shown.

A return to the treasury of \$2,749.42, money appropriated for salaries, is shown. This saving is due to the fact that a number of operators and linemen worked as "reliefs" during absence on leave, or in case of sickness of regular employees, and were paid only for time employed. A number of increases in salary provided for were not made at the time the money became available, hence the difference between the amount of salary paid and the increase provided for causing the unexpended balance, as shown above. However, all increases in salaries authorized by the budget were made by December 31, 1903, and applied to those who merited such recognition as shown by their increased efficiency and ability exhibited in performing work.

MESSAGES HANDLED.

The total number of paid commercial messages handled during the fiscal year to which this report pertains was 234,597. The tolls on same amounted to \$29,979.72. The total number of free messages handled during same period, including all departments of the insular government of Porto Rico, the Army and Navy of the United States and the United States customs and postal services, was 68,690. The computed value of tolls amounted to \$16,975.

The following comparative statement shows an increase in both volume and value of commercial messages handled during the fiscal year 1903-4 over the fiscal year 1902-3; also an increase in the volume of free messages handled during the same period, while a decrease in the value of this class of business appears:

Fiscal year.	Commercial messages handled.		Free messages handled.	
	Number.	Value.	Number.	Computed value.
1903-4	234,597	\$29,979.72	68,690	\$16,975.00
1902-3	223,675	29,381.11	63,711	19,732.96
Increase	10,922	598.61	4,979	a 2,757.96

a Decrease.

The increase shown in either volume or value of commercial business handled is not very large, but it indicates a natural and healthy growth.

The increased volume of free messages is due in part to the fact that the franking privilege has been withdrawn from all departments of the insular government by the postal authorities, and it is presumed that much of the correspondence from the various departments that formerly was sent by mail is now sent by wire. The decrease in the value of free messages is due to the fact that during the registration and election periods of the fiscal year 1902-3 many of the messages, mostly pertaining to the office of the supervisor of elections, were unusually long, frequently containing from 100 to 500 words each.

NECESSITY FOR ADDITIONAL LINES.

Extension of the telegraph lines to all towns on the island now without means of rapid communication should be encouraged.

Under existing conditions the telegraph may well be considered as being in the category of important public improvements in Porto Rico and necessary for the proper carrying out of both official and commercial business. The need, not to mention the convenience, of a telegraph office at a number of towns, having comparatively large populations, whose only means of communication at present are the mails or special messenger, can better be imagined than described.

It is safe to say that wherever a telegraph office has been established in Porto Rico in the past few years, such office has proved of value to the commercial and social welfare of the place, and it is the cheapest method for the insular government to give isolated communities communication with the markets and the world in general. By having telegraphic communication, wholesale merchants at commercial centers are able to quote prices on goods to their customers in the interior of the island and keep them advised as to the condition of the market; the telegraph provides a means of diffusing this information cheaply and expeditiously. At present, merchants whose places of business are located at towns difficult of access by transportation, and travel by coach being expensive, even where good roads exist, can not take or receive advantage of the rise or fall of prices at their market when buying or selling, which disadvantage tends to retard development along commercial lines.

I have observed at many of the towns visited by me while on inspection trips during the past year that merchants, especially those handling provisions and other staple articles, are enlarging their establishments and otherwise endeavoring to expand to provide for prospective increase in volume of their business. This may well be regarded as a sign of general improvement, and certainly the establishment of telegraphic communication at towns whose residents do not at present enjoy this method of communication would furnish a means for further and more rapid development of all enterprises now established and it is believed would encourage a

diversification of enterprise, according to the resources of each locality, a thing so urgently needed for the well-being of the people who reside in the interior towns of this island.

Modern development can not progress unless modern facilities be provided, and it is evident that those who have had to do with providing funds for the bureau of insular telegraph since it was established do not regard the telegraph service in the proper light. Judging by the limited amount of money that has been appropriated in the past, since 1901, for construction of telegraph lines, it would seem that it was being looked upon as a burden to the government or at least treated as a matter of secondary importance instead of what it is—a thing indispensable and necessary; a forerunner of civilization and promoter of social and business welfare.

The slowness on the part of the legislature to recognize the telegraph in its true light, and make ample provision for extension of the system, may be accounted for, in part at least, by the fact that before it came under the control of the insular government of Porto Rico it had been maintained for military purposes and devoted, in a large measure, to handling official messages, while commercial interests were, to a great extent, subservient to the disposition of and treatment accorded them by the operators, who were not restrained from being guided by personal likes or dislikes of those who would use this method of communication. So with the disadvantage of an antiquated system, and that badly kept, combined with a worse service, due to a lack of desire on the part of employees to perform work, whose acts tended to discourage rather than encourage use of the wires, it may be that those among them who are not familiar with conditions as they now exist—a modern plant, up-to-date and well equipped, an efficient corps of operators maintained for the purpose of rendering to the public as well as to the government quick and reliable service, and no military master to serve—and view the telegraph from past experience may allow the thoughts of treatment accorded the public at that time by this important branch of the government, much abused in those days, to militate against fair treatment at present.

However, the results obtained by this bureau in establishing and maintaining a service, without regard to its extent, unsurpassed in efficiency and all else that the telegraph stands for, should recommend it to all upon whom it relies for maintenance and obtain from them hearty support in way of ample provision for a liberal extension, in the near future, of the lines. The revenue, in way of line receipts, produced and deposited in the treasury of Porto Rico (none of which funds are used by this service) as an off-set to appropriations allotted for maintenance in the past, should argue strongly in favor of the plea for sufficient funds to continue the building of lines until each hamlet in Porto Rico is reached and provided with a telegraph office.

Referring to the United States, Porto Rico at present enjoys a unique position with regard to its telegraph. The question of government ownership of the telegraph has for some time been a subject for discussion. Porto Rico has the opportunity of demonstrating whether or not governmental administration and operation is practicable and economical, and the matter, so far successful, should be developed to the fullest extent and given a fair trial.

If, in Porto Rico, with a comparatively small amount of work to perform, owing to the limit both of enterprise and country, with a low tariff rate—lower than is at present charged by telegraph companies in the United States, except in large cities where special rates are charged for local messages or between points where competition is great—the telegraph system can be equipped with modern and up-to-date instruments, employees paid a good salary, and yet show a surplus of earnings, the example may go far toward solving the problem above referred to, which would redound to the credit of the administration and be an honor to the island.

In my report for the fiscal year 1902-3, I stated that when the projected main lines were built but little in the way of construction work would remain to be done, as when these lines were constructed and in operation the system would, owing to the limited area of the island, be practically complete, except perhaps a number of short spurs might be found necessary to reach towns where at present the need of a telegraph office is not apparent; and that upon the completion of this work the need for appropriations, other than for maintenance, would not exist. It does not seem unreasonable to anticipate that the telegraph system would be self-sustaining when the projected extensions have been made. The results obtained, with reference to service rendered, and revenue, in the way of line receipts, produced, if taken as a criterion, is cogent proof that the telegraph may be relied upon as a producer of revenue rather than a drain upon the treasury of the island for its maintenance.

The amount of money that would be required to establish the projected lines and equip for operation a number of additional offices, say 25, would be insignificant as

compared with appropriations made for other public improvements not more essential to the welfare of the people or public interest.

It no doubt is the intention ultimately, by gradual extension, to give the island a complete telegraph system, and, since the outlay of money for such work would be the same if done in the near future, all at once, or later, by successive additions, it might be considered good policy to take advantage of the benefits, financial and otherwise, that would accrue if done at an early date, and at the same time secure to the government as well as the people access by telegraph to all parts of the island.

Number and value of commercial and free messages handled for the year 1903-4.

Month.	Paid commer- cial mes- sages handled.	Value.	Free messages handled.	Computed value.	Total of messages handled.	Value.
1903.						
July.....	17,267	\$2,225.10	3,915	\$1,243.02	21,182	\$3,468.12
August.....	13,664	1,752.55	3,836	1,174.37	17,500	2,926.92
September.....	15,947	1,971.85	4,658	1,466.30	20,605	3,438.15
October.....	20,097	2,547.95	5,666	1,607.22	25,763	4,155.17
November.....	19,515	2,500.57	5,518	1,279.41	25,033	3,779.98
December.....	21,438	2,740.90	5,439	1,272.08	26,877	4,012.98
1904.						
January.....	20,372	2,601.65	5,652	1,226.91	26,024	3,828.56
February.....	20,618	2,775.48	5,801	1,306.50	26,449	4,081.98
March.....	21,875	2,798.67	6,556	1,490.80	28,481	4,289.47
April.....	21,403	2,741.65	6,844	1,577.25	28,247	4,318.90
May.....	20,005	2,525.41	6,884	1,592.13	26,889	4,127.54
June.....	22,366	2,787.94	7,921	1,739.01	30,287	4,526.95
Total.....	234,597	29,979.72	68,690	16,975.00	303,287	46,954.72

Total earnings of the bureau, including value of free business, for the fiscal year 1903-4 \$46,954.72

Actual cost of operation and maintenance for the fiscal year 1903-4, expended under the various subheads—

For salaries	\$38,432.38
For rent of offices	980.34
Light for stations	179.22
Transportation and subsistence of employees	348.23
Freight and wagon transportation	232.67
Purchase of material and miscellaneous expenditures	495.77
	40,668.61

Earnings of the lines over and above the cost of operation and maintenance 6,286.11

Cost of extending, moving, and rebuilding telegraph lines, fiscal year 1903-4, expended under subheads—

Transportation and subsistence of employees	\$639.75
Freight and wagon transportation	266.00
Purchase of material and miscellaneous expenditures	3,027.17
	3,932.92

Earnings of the bureau over and above all expenses, including operation, maintenance, and reconstruction of lines 2,353.19

Total appropriations for the fiscal year 1903-4:

For salaries	\$40,060.00
For salaries (deficiency appropriation)	1,121.80
For contingent expenses	6,270.00
For contingent expenses (deficiency appropriation)	300.00

47,751.80

Total amount expended during the fiscal year 1903-4:

For salaries	\$38,432.38
For contingent expenses	6,169.15
	44,601.53

Unexpended balance returned to the treasury:

For salaries	\$2,749.42
For contingencies	400.85
	—————
	\$3,150.27
	—————
	\$47,751.80

Respectfully submitted.

L. G. MCGUIGAN,
Superintendent of Insular Telegraph.

Hon. W. H. ELLIOTT,
Commissioner of the Interior.

EXHIBIT D.

REPORT OF THE CHIEF OF THE BUREAU OF AGRICULTURE AND MINES.

DEPARTMENT OF THE INTERIOR OF PORTO RICO,
BUREAU OF AGRICULTURE AND MINES,
San Juan, June 10, 1904.

SIR: In compliance with instructions contained in your letter of May 16, 1904, I have the honor to submit the following report of the operations of the bureau of agriculture and mines from July 1, 1903, to June 30, 1904:

The duties of the burear are limited to the publication of agricultural bulletins, furnishing to the public information on matters connected with agriculture and mining, and carrying out the business relative to mining claims and concessions.

AGRICULTURAL BULLETINS.

Ten bulletins have been published since July 1, 1903, and two others, that are to be issued during the present month, are being printed. These twelve bulletins will aggregate 498 pages of printed matter and 14,400 copies, the subjects treated being as follows:

- No. 13. Los abonos comerciales; El encalado de los suelos.
- No. 14. Plantas leguminosas para abono verde y para forraje; El estiércol.
- No. 15. El jengibre en Jamaica; Algunos de los principales productos del maíz; Cultivo del tomate en los Estados Unidos.
- No. 16. La batata.
- No. 17. Algunos remedios contra los principales insectos que atacan el tabaco; El bisulfuro de carbono como insecticida; Posibilidad del cultivo del caucho en Puerto-Rico.
- No. 18. Insecticidas importantes; Fungicidas ó remedios para las enfermedades fungosas de las plantas.
- No. 19. Indicaciones prácticas sobre el cultivo de frutas; La Yuca.
- No. 20. El mango en Puerto-Rico.
- No. 21. El maní, su cultivo y sus usos; La pepita del algodón y sus productos.
- No. 22. Razón de las labores del suelo; Sistemas de explotación de fincas agrícolas en los Estados Unidos.
- No. 23. El drenaje.
- No. 24. Fermentos del suelo importantes en agricultura.

The greater part of these productions have been taken from publications of the United States Department of Agriculture, and are translations of, or mere compilations from, said publications. Some articles have been taken from the bulletin of the botanical department of Jamaica. In their selection preference has been given—first, to those describing improved methods for the cultivation of special tropical crops that are grown or can be grown advantageously in Porto Rico, and, second, to those advertising to general agricultural questions and to the general principles that are to guide the farmer in the various operations for the production and marketing of crops. This has been appreciated by this bureau as the most judicious way of meeting the purpose of the bulletins, which is in its opinion to provide to the greatly felt necessity in Porto Rico of showing farmers those facts and principles that experience and experiments in other countries have made known in a conclusive manner, and which by their general character are of universal application and constitute the foundations of agricultural progress. In effect, among the problems confronted by the farmer in Porto Rico, there are many bearing a local character, which can only

be solved by dint of special and continuous investigations carried out at an agricultural experiment station. It would not be reasonable to pretend that these investigations would lead necessarily to immediate results. The problems to be solved are, as a rule, so complex and involve elements so variable and so entirely out of the control of the investigator that the attainment of favorable results can only be the work of time, however intelligently and judiciously the experiments may be conducted. It is not to be wondered either that sometimes negative conclusions are only obtained, albeit—and this is a fact shown by experience in all progressive countries—the results collected through time by the patient task carried out in the experiment stations have such an economic bearing, be it on account of the increased yield of crops that may be obtained or the losses that may be avoided therefrom, that the cost of maintaining such stations is comparatively of no consequence.

It is therefore of the greatest importance for the furtherance of our agricultural industry that the experiment stations in the island be efficiently supported both by the government and by the people at large. But besides these questions, which are to be the subject of special investigations, there are many others encountered by the Porto Rican farmer, the solution of which will be given or at least greatly aided by a wise application of the general principles already established by agricultural science and of the improved general methods warranted by experience in other countries. With this motive in view, it was considered that in the interim our farmers can avail themselves of the results of the work of the experiment station, and our agricultural industry might be favored to a great extent by the dissemination through the agricultural bulletin of the department of the interior of the principles and general methods for the production of crops, their safeguard against insect pests and other enemies, the preservation of the fertility of the soil, and the feeding and improvement of farm animals.

The favorable reception which these bulletins seem to have had, judging from the increasing demand for registration in the mailing list and the favorable comments of the press, lead to the belief that the idea that they answer to a real necessity in Porto Rico is not a mistake, and it is to be regretted that the necessity of reductions in the budget for the ensuing fiscal year led the legislative assembly to discontinue the appropriation for the publication of the bulletin.

The cost of printing these bulletins, including the two now being printed, will be \$718, and the expense for stamps for their distribution \$282, aggregating a total of \$1,000.

PRINCIPAL CROPS.

The figures handed in by the collector of customs aenent the exportation of the chief agricultural products, and some private information, allow of making the following remarks in regard to the importance of the last crops:

Sugar.—Although an increase in the extent of cane plantations for the year 1903 had been reported, the yield has not been quite satisfactory and the amount of sugar produced by the cane ground during the year has been lower than that of the year 1902 by about 5,094,000 pounds. The price, on the other hand, has been somewhat higher, and the cash value of the crop has exceeded that of 1902 by about \$418,717.

The amount and value of sugar and molasses shipped from Porto Rico to the United States during the years 1902 and 1903 were as follows:

Year.	Sugar.		Molasses.	
	Amount. <i>Pounds.</i>	Value.	Amount. <i>Gallons.</i>	Value.
1902	206,341,994	\$6,395,137	1,964,393	\$351,801
1903	201,247,040	6,813,854	2,434,434	320,345

The prospect for the present year is most alluring. Prices for sugar are high, and it is estimated that the present crop will be 15 per cent more than that of last year. It is to be expected that the thriving state of this industry will induce the investment in central factories in the various districts of the island, where there are still great tracts of lands suitable for the culture of sugar cane.

Coffee.—Information with regard to the coffee crop for 1903 seemed to indicate that it would be greater than that of 1902. However, the figures from the custom-house with regard to the exportation of this commodity show that the difference between the two crops, if any, is of no import. In fact, up to May 31, 1904, by which date almost all the crop for 1903 should have been exported, shipments to the United States and

foreign countries only amounted to 33,676,707 pounds, a sum lower by 1,450,978 pounds than that of the crop for 1902. The conditions of the market have improved somewhat since the beginning of the year with higher prices, but this increase of prices came rather late, when the greater part of the crop had been turned to dealers, so that it was of small profit to planters.

The aggregate amount and value of shipments of coffee from Porto Rico to the United States and foreign countries for the four last crops has been as follows:

Year.	Amount.	Value.
	Pounds.	
1900	12,157,240	\$1,678,765
1901	26,906,399	3,195,662
1902	35,127,685	3,970,574
1903	a 33,676,707	a 3,829,695

^aExportation of this crop is not yet ended. The figures include shipments made up to May 31, 1904.

The shipments of coffee to the United States have been greatly reduced in the present year, amounting only to 2,363,332 pounds, with value of \$272,801, during the eleven months from July 1, 1903, to May 31, 1904, against 6,363,332 pounds and value of \$718,531 during the fiscal year 1902-3.

Information received with regard to the condition of the next crop is unfavorable. The condition of the weather during the first months of the year was not propitious, and the yield of the crop is estimated as very meager.

Tobacco.—It has not been possible to ascertain the amount of the last tobacco crop, but 5,000,000 pounds seems to be a conservative estimate. The prices for this staple have been low and discouraging to planters.

The amount and value of tobacco and cigars shipped to the United States during the years 1902 and 1903 are as follows:

Year.	Leaf tobacco.		Cigars.	
	Amount.	Value.	Amount.	Value.
	Pounds.		Thousands.	
1902	417,478	\$60,655	93,848	\$2,131,799
1903	1,268,060	255,814	56,145	1,445,640

Fruits.—The shipping of oranges and other fruits to the United States is increasing, as shown by the following figures of the value of shipments of said produce during the years 1902 and 1903:

Year.	Oranges.	Other fruits.
1902	\$77,006	\$37,136
1903	314,094	64,116

Cotton.—A certain amount from the test crop planted last year was harvested in the first months of the current year. As a rule the results have been satisfactory, and prices paid at San Juan for seed cotton have ranged from \$5 to \$8. These prices are high enough to induce the growing of this plant on a great scale. In some cases planters have not obtained the expected results, but this is not to be wondered at, since it is a new culture now started. At any rate, the satisfactory results obtained by many planters seem to indicate that cotton can be grown successfully in Porto Rico. Moreover, as it is a culture which requires small capital, and as the product does not need any especial preparation to be put on the market, it is within the scope of those having small tracts of land, and it appears that its development might greatly improve the critical conditions of small landowners of the interior, due to the low price of coffee.

MINES.

On July 1, 1903, 22 applications for mining concessions were pending, and 19 more have been filed since that date, making a total of 41 claims prosecuted in the bureau during the present fiscal year. All these claims were canceled by the com-

missioner of the interior, by virtue of an opinion given by the attorney-general for Porto Rico on September 17, 1903. According to this opinion, the property of minerals under private lands, which by the old mining law was vested in the people of Porto Rico, was transferred to the owner of the land by the provisions of the new civil code that took effect on July 1, 1902, and accordingly the right to establish mining claims on land of private property was discontinued from the same date.

Very respectfully,

JUAN BTA RODRIGUEZ,
Assistant Commissioner of the Interior,
Chief Bureau of Agriculture and Mines.

Hon. W. H. ELLIOTT,
Commissioner of the Interior.

EXHIBIT E.

REPORT OF THE CHIEF OF THE DIVISION OF ARCHIVES.

DEPARTMENT OF THE INTERIOR OF PORTO RICO,
DIVISION OF ARCHIVES,
San Juan, P. R., May 17, 1904.

SIR: In compliance with the instructions in your communication of the 16th instant, directing a report of the operations of this division of archives from July 1, 1903, to June, 1904, and full statistical report to July 1, 1904, I have the honor of submitting to you the following report:

The task of the entire organization of these archives intrusted to this division has been carried forward rapidly during the fiscal year beginning July 1, 1903, up to this date.

The work accomplished has been important, as we have been able to establish order out of the chaos of papers that were scattered throughout the lower floor of this building.

Archives belonging to the different branches constituting the system of Spanish administration during the four hundred years of its domination were to be found disseminated here in all directions.

Here were found documents pertaining to the archives of the twelve custom-houses of the island, department of finance, auditor, treasury, taxes and revenues, diputacion provincial, courts of justice, general supervision of forest and mines, and board of public works and technical management of the same.

They make a total of 22 archives in charge of this division, which had to be put in a perfect state of organization, not only to comply with what is provided in section 8 of the treaty of Paris, but also to facilitate the prompt dispatch of affairs now intrusted to the department constituted after the American occupation.

This necessity is easily explained on account of the close connection between the Spanish administration and the present one with regard to taxes, property of the nation, religion and clergy, and other services in which procedures were pending when the radical change took place.

All documents pertaining to public finances, footing 1,451 packages of records, where can be learned the history of the Spanish domination during the long period of its government, are perfectly organized, classified, and inventoried.

Documents pertaining to the organization of the extinguished board of public works come after, amounting to 48 packages of records, where are to be found plans and drawings made by Spanish engineers during the fourteen years of its existence, or from its establishment in 1882 until it was abolished by a military order issued by General Henry.

We proceeded forthwith to the organization of the library of this division, where are held in custody all account books of the different branches of the Spanish administration, and all printed books which were scattered in many places of this department, amounting to a total of 2,107 volumes, among which are to be found important data anent ultramarine legislation, which are at present availed with great benefit to the departments created for the American administration of the island.

Finally, all important documents belonging to the extinguished "diputacion provincial" have been organized, classified, and inventoried, making a total of 2,130 packages of records containing the history of that civil institution from its start to its termination, due to the change of domination of this island.

This is the task accomplished by this division of archives during the period stated at the beginning of this report.

But the work is not completed. We are about to begin the organization of the old archives of the courts of justice, an indispensable task on account of penal data which undoubtedly will be called for when wanted at the office of the attorney-general and by the supreme and district courts.

And, after having finished this work, there will remain for the ensuing fiscal year the organization of the voluminous archives of the executive department, which are now in many boxes in the stores of public works, being boxes returned from Washington to be kept in custody in this island.

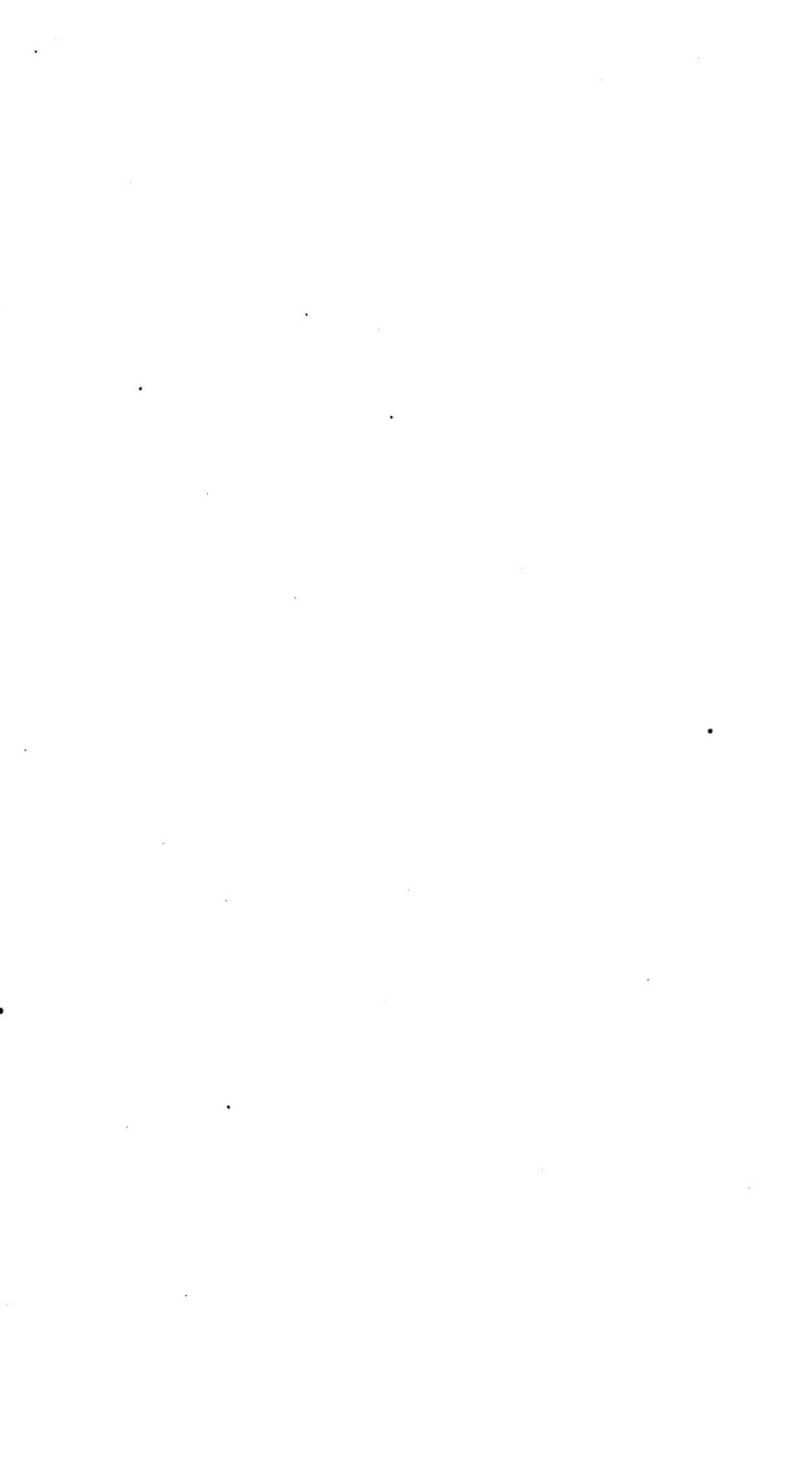
Respectfully,

T. A. DAUBON,
Chief Division of Archives.

Hon. W. H. ELLIOTT,
Commissioner of the Interior.



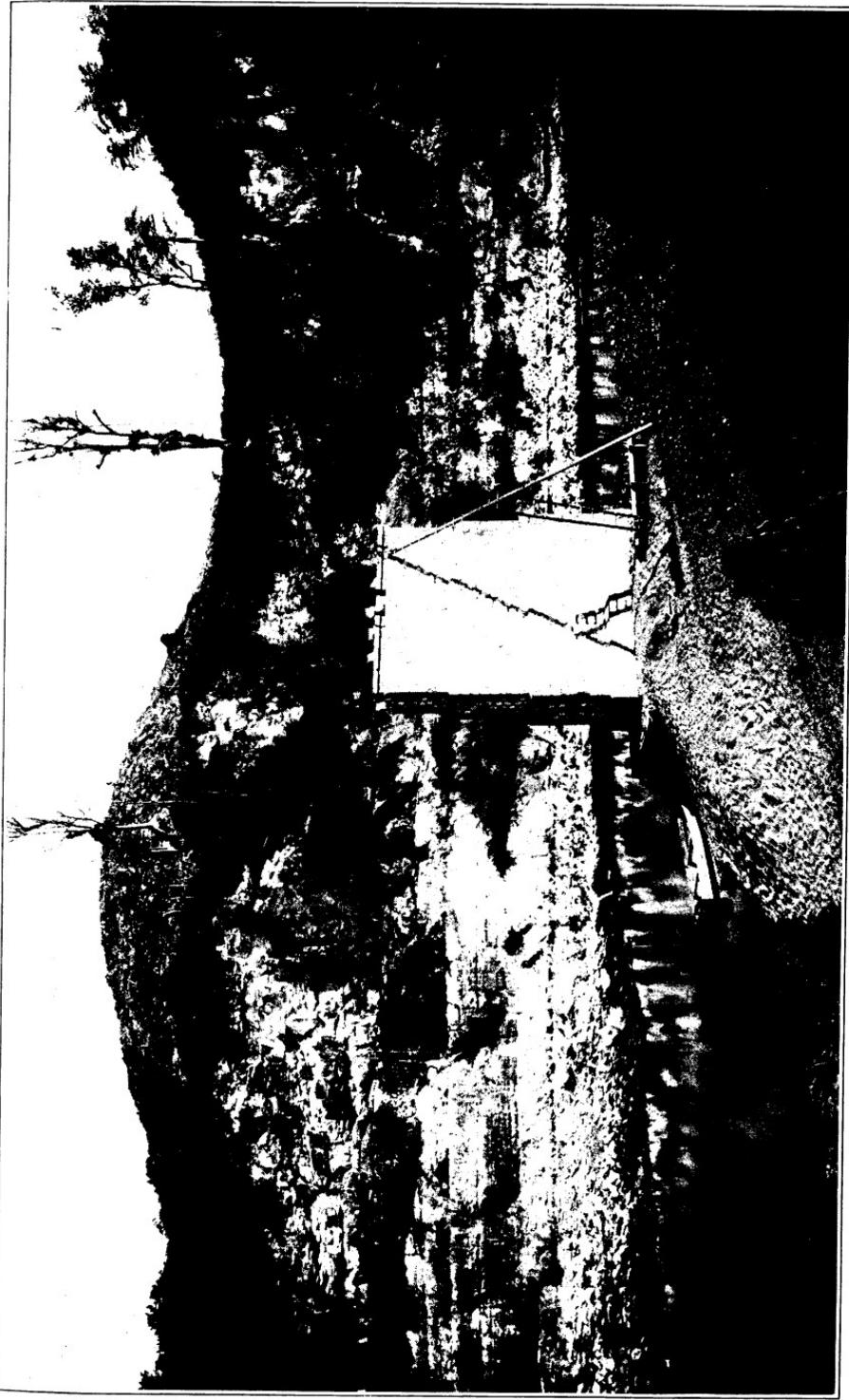


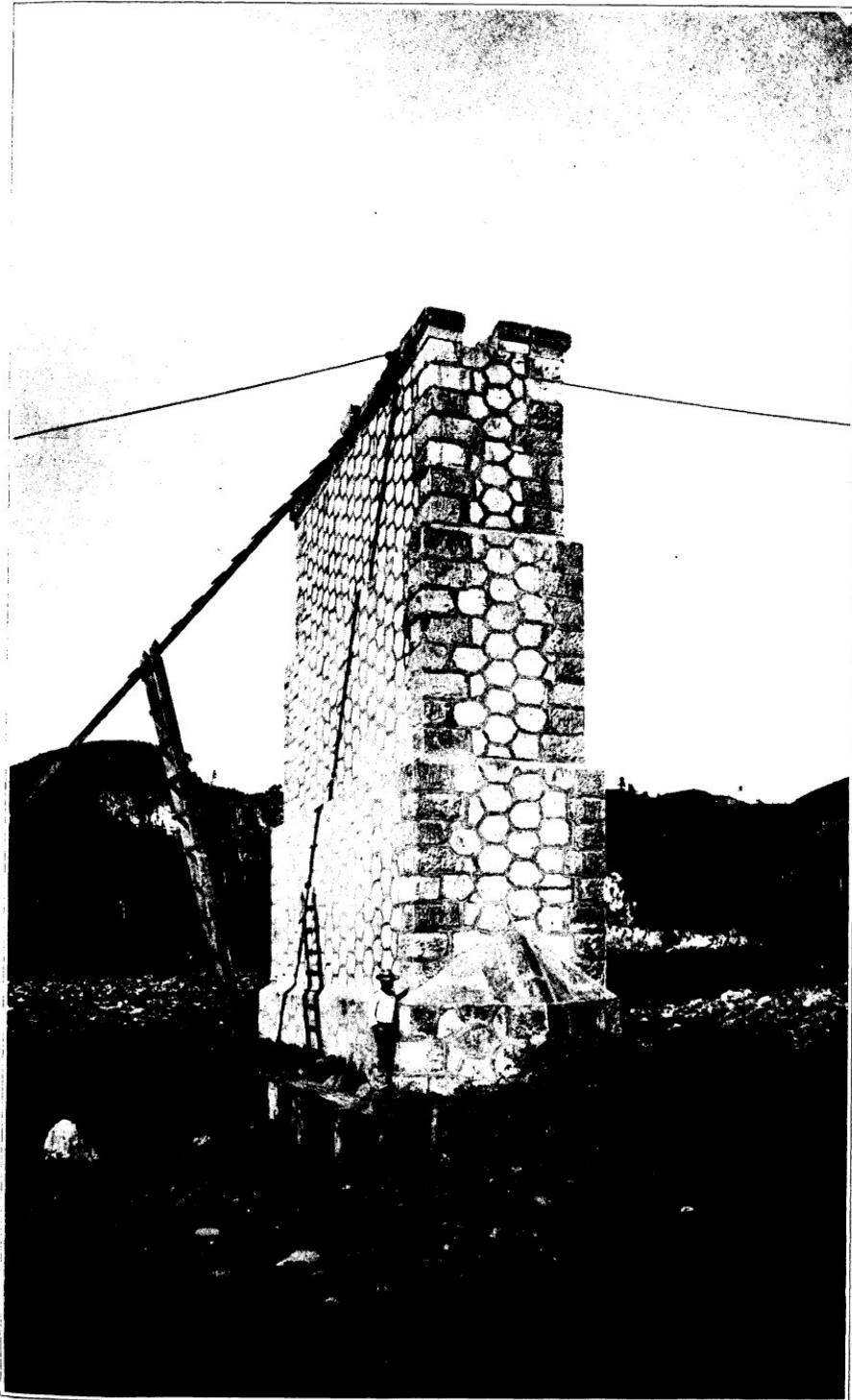


VIEWS
OF
ROAD WORK AND CONVICT CAMPS.

1903-1904.

MANATI RIVER, SHOWING PIER AND NATURAL ABUTMENT.





MANATI PIER.





DAJAOS BRIDGE, BAYAMON-COMERIO ROAD.





CANCEL BRIDGE BAYAMON-COMERIO ROAD.





SUBMERGIBLE BRIDGE, AÑASCO RIVER.





SUBMERGIBLE BRIDGE, AÑASCO RIVER.



ROAD NO. 6, TALLONES-ADJUNTAS SECTION. VIEW LOOKING FROM TALLONES.



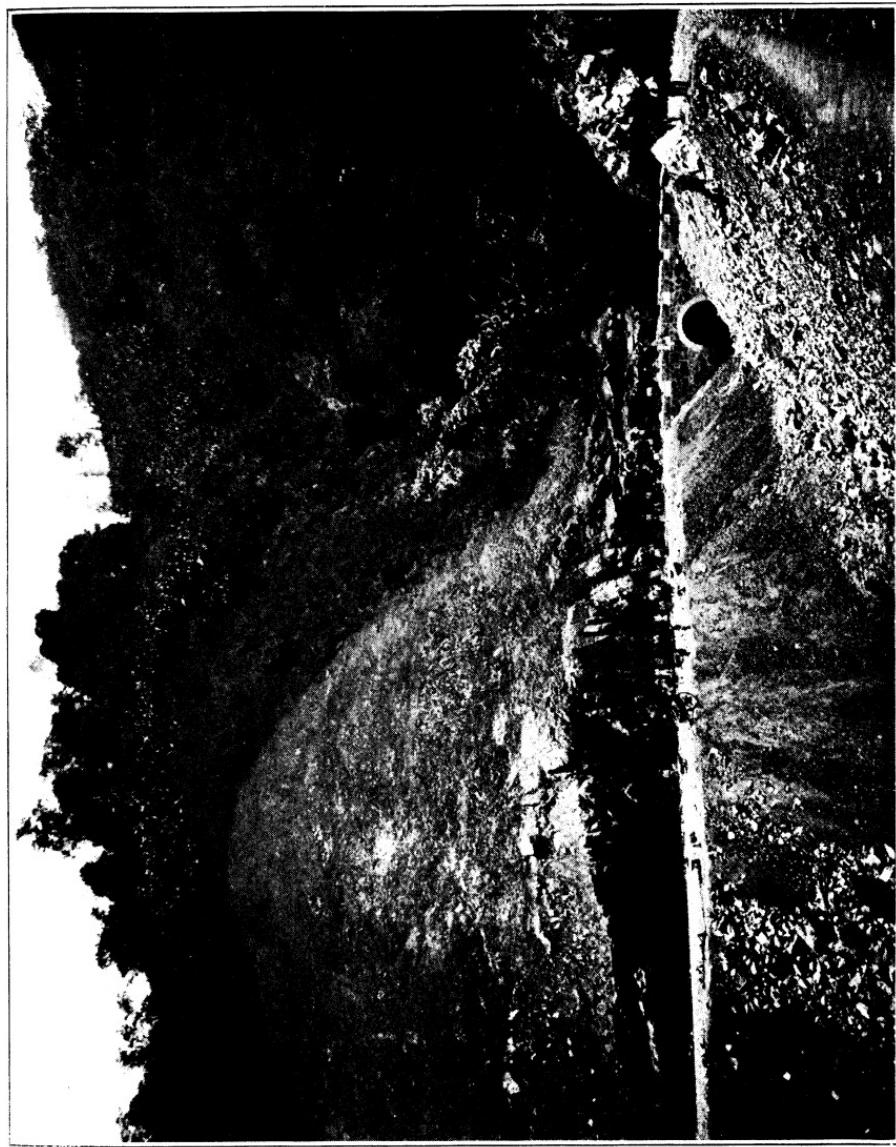


ROAD NO. 6, TALLONES-ADJUNTAS SECTION. ONE KILOMETER OF HEAVY WORK AT TALLONES.





ROAD NO. 6, TALLONES-ADJUNTAS SECTION. CURVE 3 $\frac{1}{2}$ KILOMETERS FROM ADJUNTAS.



ROAD NO. 6, TALLONES-ADJUNTAS SECTION. ROCK CUT AND CULVERT, TALLONES.





ROAD NO. 6, TALLONES-ADJUNTA SECTION. HEAVIEST CUT AT TALLONES.





ROAD NO. 6, TALLONES-ADJUNTAS SECTION. GENERAL VIEW KILOMETER 3 TO KILOMETER 5.



Report of a Commission of Interior for Porto Rico, 1904.



FINISHED ROAD, BAYAMON-COMERIO.



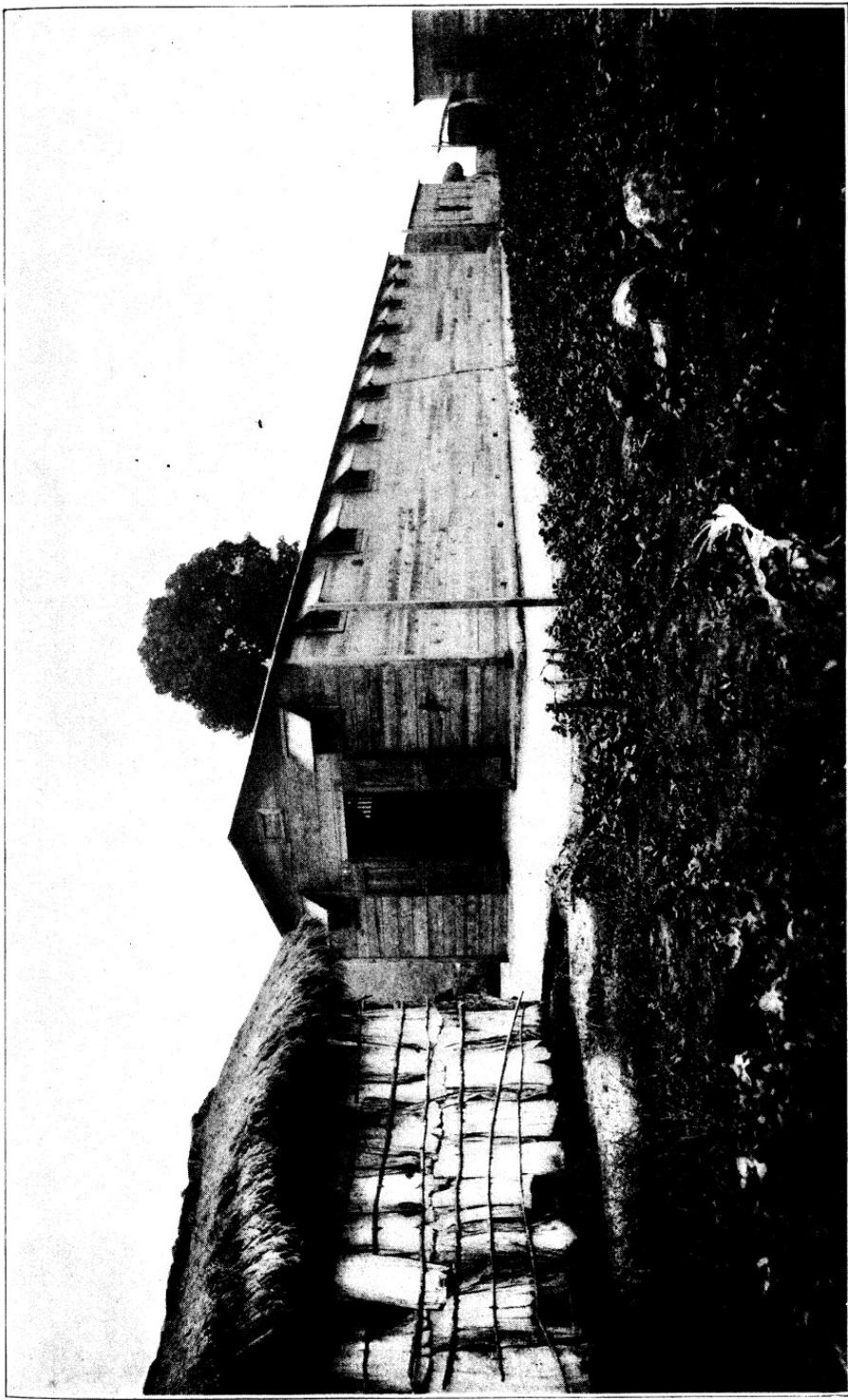


FINISHED ROAD, BAYAMON-COMERIO.



FINISHED ROAD, TALLONES-ADUANTAS. STEAM ROLLER USED FOR CONSOLIDATION.





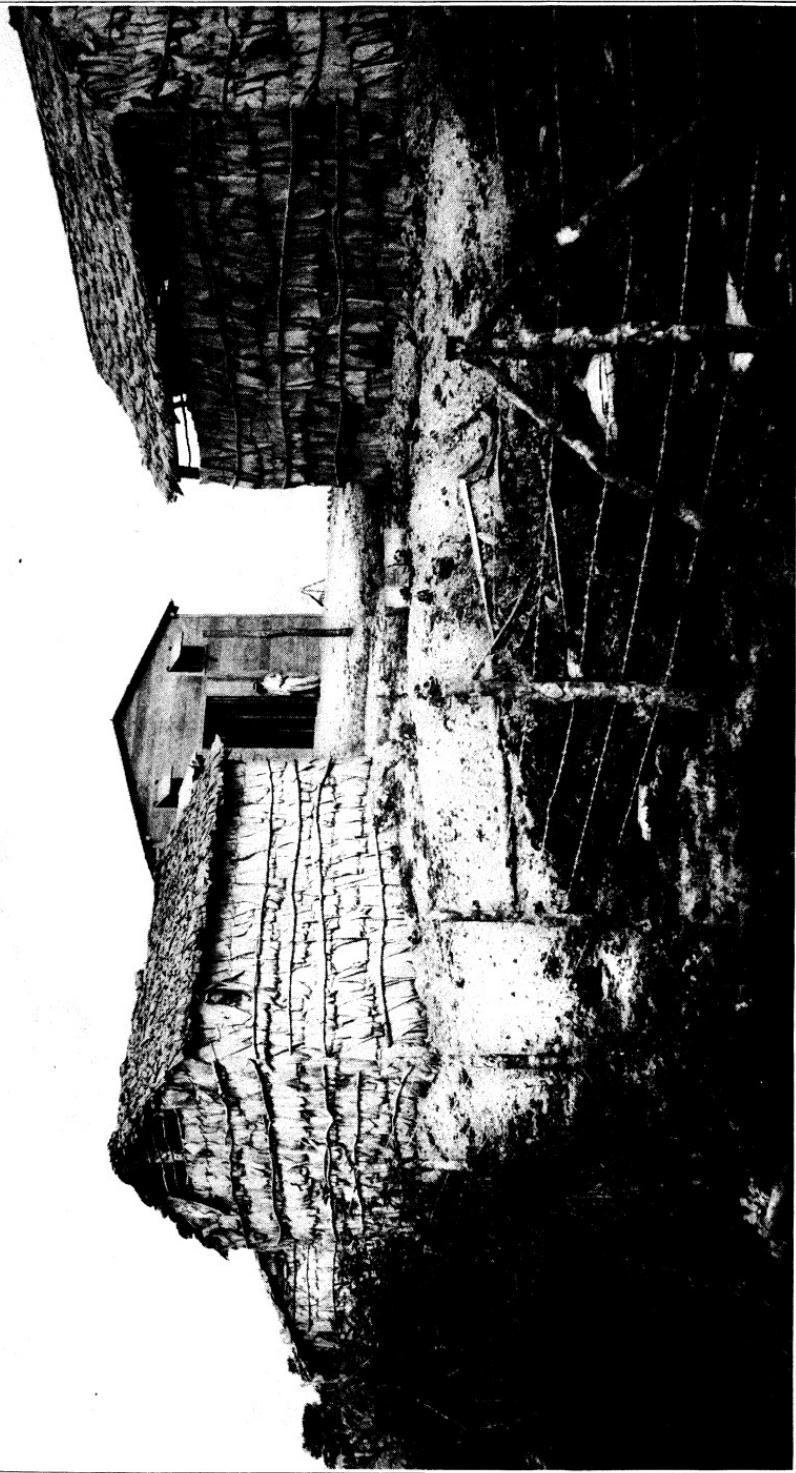
Report of Commissioned Inspectors Ry. 1 [1901]

CONVICTS' CAMP AT HUMACAO.

UNIV.
of
MICH.



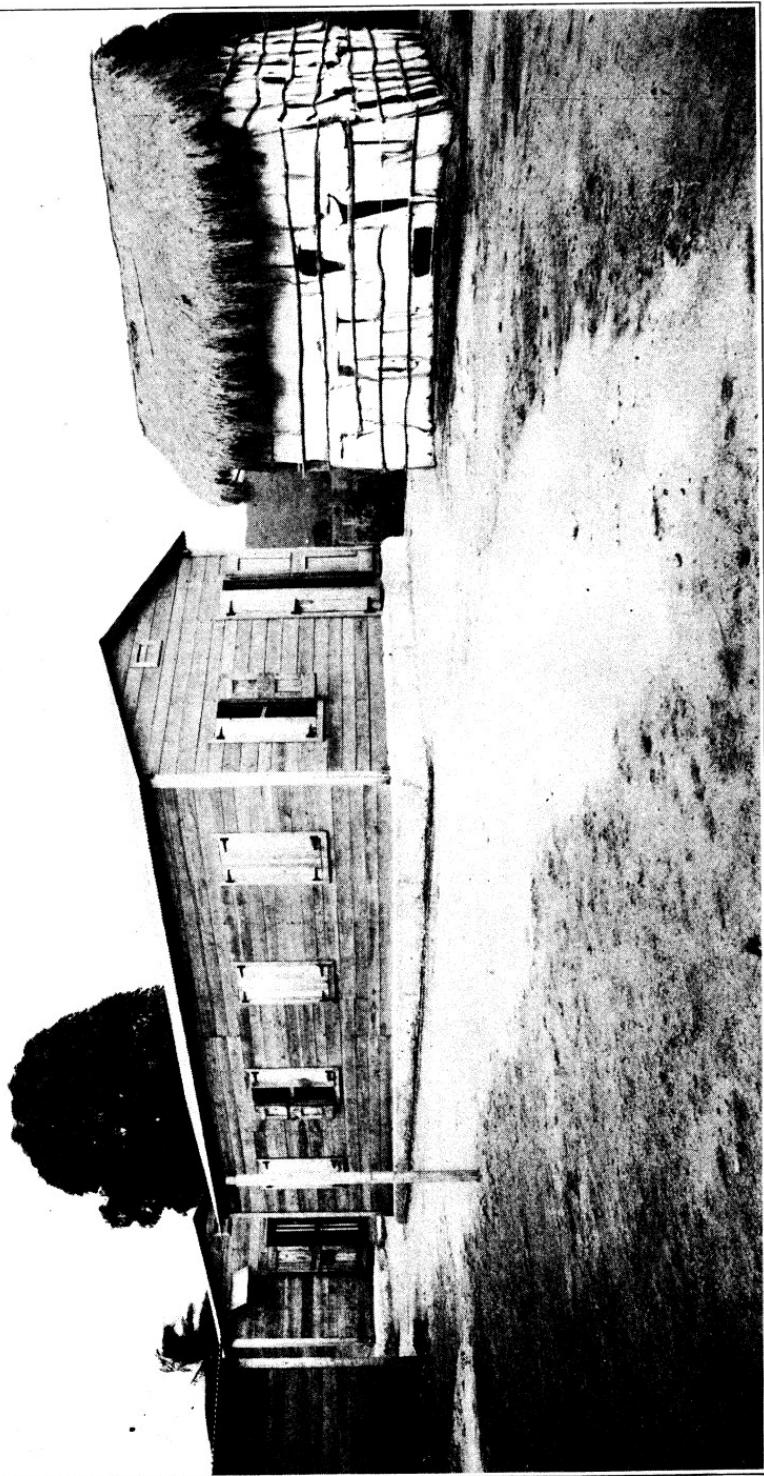
CONVICTS' CAMP AT JAYUYA.



CONVICTS' CAMP AT JAYUYA.

UNIV.
of
MICH.





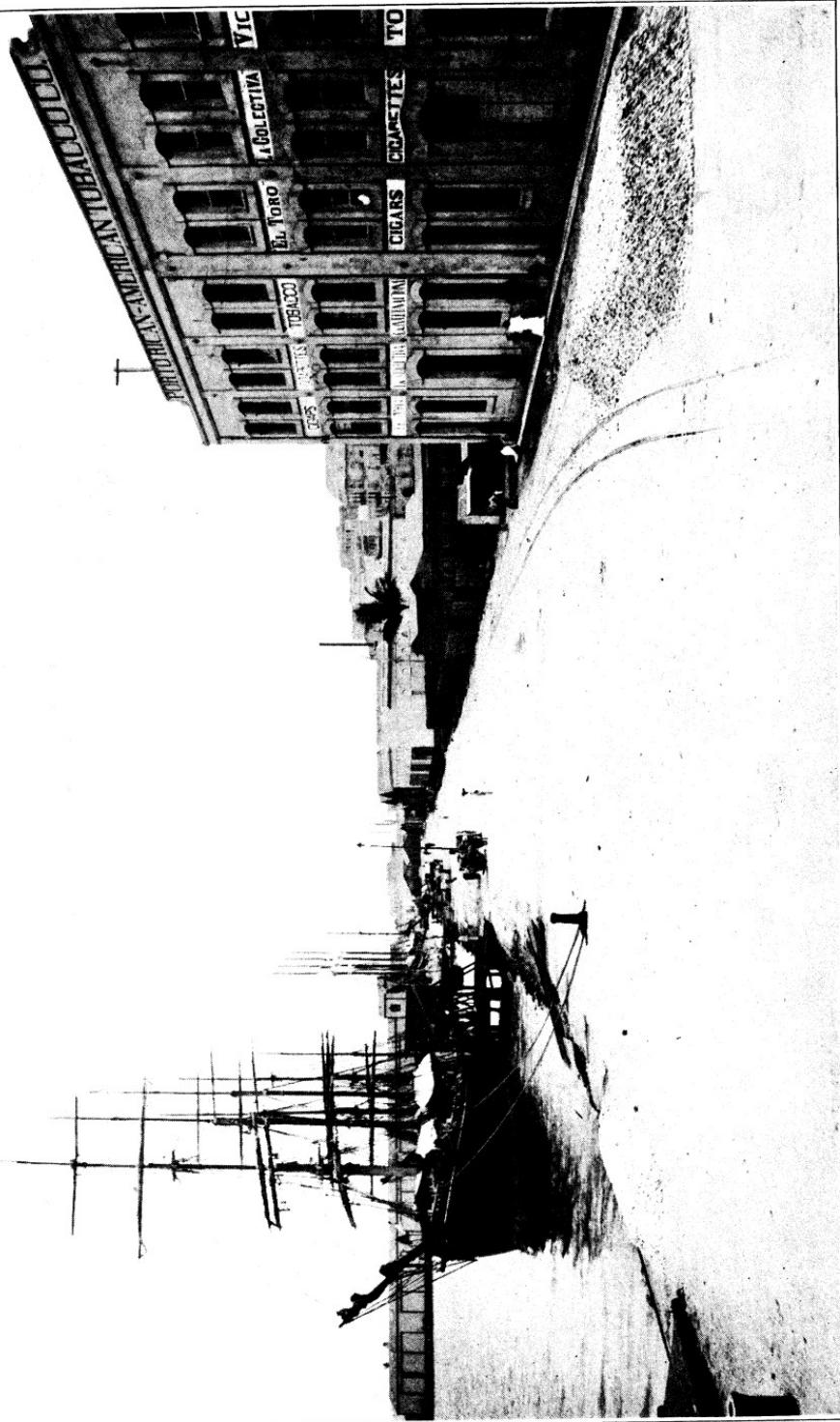
CONVICTS' CAMP AT HUMACAO.

UNIV.
or
NICH.



CONVICTS' CAMP, JAYUYA. INTERIOR OF BARRACKS.

UNIV.
OF
MICH.

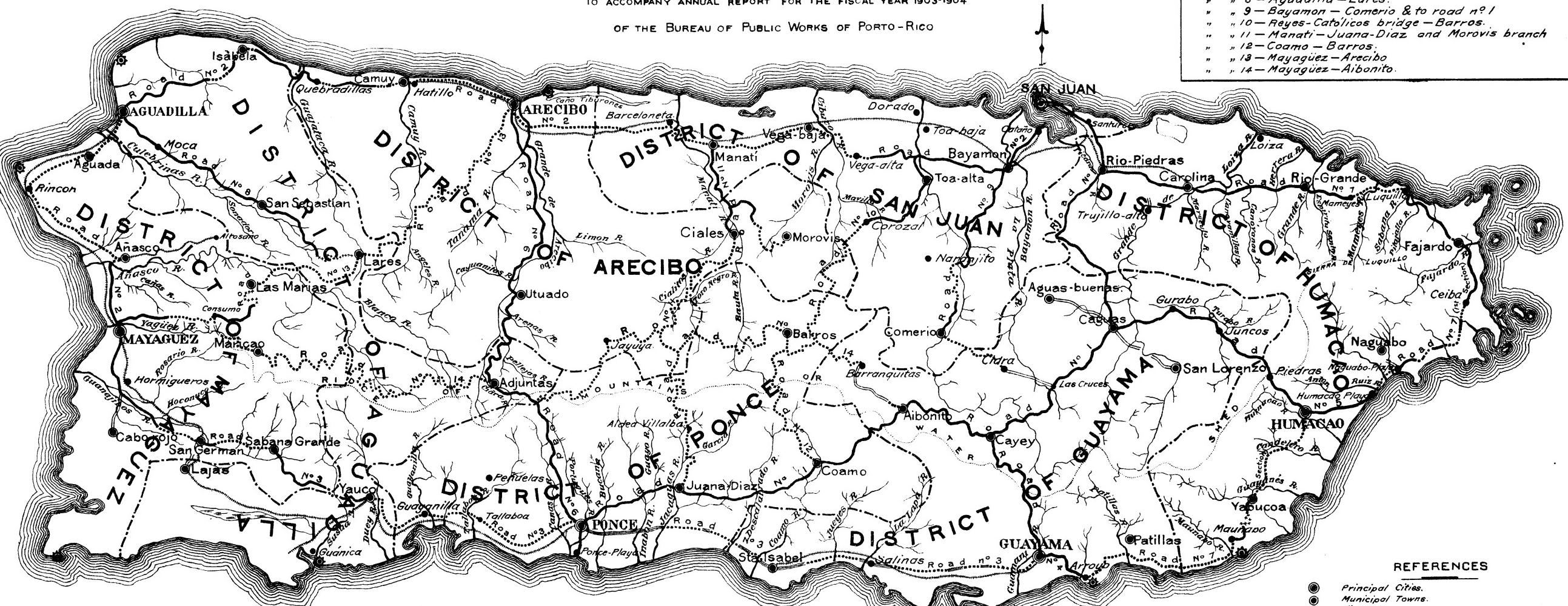


RECONSTRUCTION OF THE STREET ALONG THE WATER FRONT OF SAN JUAN HARBOR.

UNI
of
MICH

MAP OF THE ISLAND OF PORTO-RICO.

TO ACCOMPANY ANNUAL REPORT FOR THE FISCAL YEAR 1903-1904
OF THE BUREAU OF PUBLIC WORKS OF PORTO-RICO



San Juan, P.R. June 30, 1904.

P. J. Fernandez

Acting Superintendent of Public Works.

GENERAL PLAN OF INSULAR ROADS

- Road n° 1 - San Juan - Ponce-playa.
- " " 2 - Cataño - Mayagüez.
- " " 3 - Mayagüez - Guayama.
- " " 4 - Cayey - Arroyo.
- " " 5 - Caguas - Humacao-playa.
- " " 6 - Ponce - Arecibo.
- " " 7 - { 1st SECTION: Rio-Piedras-Humacao playa.
" " 2d " " " Humacao-Arroyo.
- " " 8 - Aguadilla - Lares.
- " " 9 - Bayamon - Comerio & to road n° 1.
- " " 10 - Reyes-Católicos bridge - Barros.
- " " 11 - Manati - Juana-Díaz and Morovis branch.
- " " 12 - Coamo - Barros.
- " " 13 - Mayagüez - Arecibo.
- " " 14 - Mayagüez - Aibonito.

REFERENCES

- Principal Cities.
- Municipal Towns.
- Villages.
- Section of Insular Road completed.
- " " " " under construction.
- " " " " repaired.
- " " " " to be constructed.
- Visional Road constructed or repaired by the Bureau.
- Railroad.
- Boundaries of Municipal Road District.
- Light House.

Oversized
Foldout-
Unable
to Scan

